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50TH CONGRESS, 2d Session. | SENATE. | REPORT No. 2686, Part 2.

U.S. Congress. Joint select committee on the Washington aqueduct tunnel.

TESTIMONY

TAKEN BY THE

JOINT SELECT COMMITTEE OF CONGRESS

IN REGARD TO

THE WASHINGTON AQUEDUCT TUNNEL.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1889.

WASHINGTON AQUEDUCT TUNNEL.

Testimony taken by the Joint Select Committee of Congress (composed of Hon. George F. Edmunds, chairman, Hon. Henry L. Dawes, and Hon. Charles J. Faulkner, on the part of the Senate, and of Hon. J. C. Clements, Hon. Benton McMillin, and Hon. Thomas Ryan, on the part of the House of Representatives), under and by virtue of the following action of Congress:

CONCURRENT RESOLUTION OF OCTOBER 8, 1888.

Resolved by the House of Representatives (the Senate concurring), That all work heretofore performed upon the Washington Aqueduct tunnel, together with the provisions of any contract made for the same or any portion thereof, and all the facts and circumstances connected with the bidding for, the letting and making of said contracts and subcontracts, and all expenditure of moneys heretofore appropriated for said work, together with the extent of any force employed in said work by the Government, the nature of the same and the compensation paid therefor, shall forthwith be fully investigated by a joint select committee of six members, of whom three shall be members of the Senate, to be appointed by the President of the Senate, and three shall be members of the House of Representatives, to be appointed by the Speaker. Said committee shall have authority to employ a clerk and stenographer, and such experts as it may deem necessary for the investigation. It may sit during the sessions of Congress or in recess, and shall have full power, either in full committee or subcommittee, to administer oaths and send for persons and papers, and to conduct the investigations either in Washington or in such places as may be deemed necessary, and shall make full report of its proceedings and the conclusions arrived at, with such recommendations as it may deem proper, to Congress on or before January 1, 1889.

EXTRACT FROM DEFICIENCY ACT OF OCTOBER 19, 1888.

Increase of water supply, Washington, District of Columbia: For expenses of the Joint Select Committee appointed under a concurrent resolution of Congress to investigate the work upon, and contracts and other matters relating to the Washington Aqueduct tunnel, five thousand dollars, or so much thereof as may be necessary, to be disbursed by the Clerk of the House of Representatives on vouchers approved by said Joint Select Committee.

JOINT RESOLUTION APPROVED OCTOBER 19, 1888.

[Public Resolution—No. 47.]

JOINT RESOLUTION authorizing the Secretary of War to protect the Washington Aqueduct tunnel.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of War be, and he is hereby, authorized and directed to use so much of any unexpended balance of appropriations for the work of the Washington Aqueduct tunnel, District of Columbia, as may be necessary, for the purpose of protecting and preserving the work already done upon said tunnel.

That the Joint Select Committee of the Senate and House of Representatives authorized by a concurrent resolution of Congress to make inquiry and report concerning all of the work and contracts therefor on the Washington Aqueduct tunnel and other matters in relation thereto, are hereby, in addition to the powers conferred by said concurrent resolution, authorized and directed in their discretion to inquire and report touching all plans and estimates prepared under the auspices of the Gov-

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ernment for extending the water supply of Washington City, and finally the said committee may extend their inquiries as to any and all other matters concerning the extension of said water supply that may aid the Congress in ascertaining and fixing the responsibility for any mismanagement therein or for the future construction and management thereof.

Approved, October 19, 1888.

TESTIMONY OF GARRETT J. LYDECKER.

MONDAY, *November* 26, 1888.

GARRETT J. LYDECKER, sworn and examined.

By the CHAIRMAN:

Q. You are a major in the Army and attached to the Engineer Corps?—A. Major of Engineers in the U. S. Army.

Q. What is your age?—A. Forty-five.

Q. You are now in charge of the Washington Aqueduct tunnel, I believe?—A. The Washington Aqueduct and the work for increasing the water supply, together with the erection of fish-ways at the Great Falls.

Q. When were you first connected with the Washington Aqueduct?—A. In August, 1882, I think; I think it was in August that I was assigned to that duty.

Q. You were assigned to the charge of the aqueduct, or to its extension, were you?—A. I was assigned to the charge of the extension first on the passage of the bill providing for an increase of the water supply, in addition to the duties which I was then performing as Engineer Commissioner of the District of Columbia; I was at that time on duty as Engineer Commissioner of the District of Columbia.

Q. How long had you been Engineer Commissioner of the District?—A. Since the preceding May.

Q. May, 1882?—A. May, 1882.

Q. How long did you continue to be Engineer Commissioner of the District?—A. Until the spring of 1886; I think it was about the middle of April or the 1st of May.

Q. So that from 1882 to 1886—we do not care about the precise date—you were not only Engineer Commissioner of the District of Columbia, but you were in charge of the Washington Aqueduct and its extension?—A. Yes, sir.

Q. Your duties with reference to the Washington Aqueduct extension were under orders from the Secretary of War, I suppose?—A. Under orders from the Secretary of War.

Q. Was there not a law which stated that the Engineer Commissioner should not be required to perform any other duties than those of such engineer?—A. That provision is incorporated in the organic act providing a permanent form of government for the District of Columbia.

Q. It was under that act that you became Engineer Commissioner, was it not?—A. Yes, sir.

Q. How did it happen, then, that you were assigned to these other duties by the Secretary of War?—A. I can not say what were the reasons that induced the assignment. I know that was a question under discussion; but so far as I recollect, it was on the ground that this bill provided for an expenditure of a sum of money, half of which was chargeable to the District and half to the General Government, though it was practically an expenditure such as was contemplated by the organic act for the permanent form of government for the District—that

is, where the General Government and the District shared equally in the expenditure.

Q. While you were Engineer Commissioner, and before you were assigned to the aqueduct, were any plans, estimates, etc., made up in the office of the District Commissioners in regard to the extension of the water supply?—A. None while I was Engineer Commissioner; such plans have been prepared and discussed for a period of several years under my predecessor.

Q. Major Twining?—A. Major Twining.

Q. Who was his assistant?—A. Captain Hoxie was assistant in that respect.

Q. Then when you came to the District office as Engineer Commissioner you found certain schemes on foot in regard to the extension of the water supply?—A. Yes, sir.

Q. What were the various difficulties, if there was more than one, in the way of that extension? Describe them briefly.—A. The only one of which I knew anything (and I learned of that about the time the bill was passed, I think the latter part of July) was one providing for the extension of the dam at Great Falls entirely across the Potomac River, and raising the old dam that then existed across the Maryland channel in the river.

Q. To Conn's Island?—A. To Conn's Island; yes.

Q. There was no plan or anything on paper concerning the extension when you came there?—A. I was about to describe the plans.

Q. Go on.—A. The first element was the raising of the dam at Great Falls. The second was the extension of the present aqueduct from the old distributing reservoir at Drovers' Rest to a new reservoir to be constructed somewhere near Sixth street extended and above Boundary. The exact method of doing that, so far as I know, was not specified in the bill. The construction was to finally terminate in a reservoir which would hold somewhere in the neighborhood of 3,000,000 gallons of water, to be connected by large mains with the old distributing reservoir. Those constituted the four elements. I think the only thing specified in relation to any extension of the aqueduct in the plan, as it went from the Commissioners' office, was in relation to crossing Rock Creek. It might be in tunnel if the rock was found sufficiently solid, or, if it was not sufficiently solid, by a system of cast-iron pipes. I think that was the only thing specified as to the character of this extension at that time.

Q. Was there anything on paper in the District offices about it?—A. There was a report made in 1879, I think, by Major Twining, Engineer Commissioner, transmitting the report of his assistant in the matter, and I think an estimate accompanied that report. To the best of my recollection, that is the first record that I know of in regard to that project.

Q. That report you now speak of was transmitted to Congress, was it?—A. It was transmitted to Congress.

Q. And that was printed?—A. It was printed.

Q. Do you mean to say that during your continuance as Engineer Commissioner there was no scheme in the engineer's office for any extension of the water supply before the present tunnel work began?

The WITNESS. During my time in that office?

The CHAIRMAN. Yes; and up to the time when this actual present tunnel scheme was finally adopted as the contrivance for doing it.

The WITNESS. As soon as I was assigned to the charge of this work the first point was to undertake the study of the question as to what was to be done to carry out the purpose of the law.

Q. Now, right at that point, when you began that study, was there anything else on paper in the office of the engineer concerning the means of making the increase of the water supply, aside from the report which you have mentioned as having been sent to Congress and which was made by Major Twining?—A. I have since learned that there was in the office of the Washington Aqueduct a report by Colonel Casey.

Q. I am speaking of the question as to what there was in the office of the District Commissioners.—A. So far as I know there was nothing whatever; I never heard of any.

Q. You never heard nor saw any plan or suggestion from General Meigs?—A. I have heard of that.

Q. I mean at the office at that time?—A. No, sir; I know nothing of it having been in the office at that time, to the best of my recollection.

Q. Did you know anything at that time about a plan of Colonel Casey's for an increase of the water supply by large iron mains brought straight down from the distributing reservoir and into the upper part of the city and then being tapped on cross streets?—A. In connection with this question I understand your previous question better now. I did know that General Meigs had written a letter to Congress. I understood your question to ask if we had anything of that kind in the office.

Q. It did. You say you had nothing in the engineer's office?—A. We had nothing in the engineer's office. It was only in the process of study that I learned from some Congressional documents that he had submitted such a letter.

Q. Did you have in the engineer's office anything on the subject of iron-pipe extension?—A. I learned that in the same way, by Congressional documents published afterward.

Q. But there was nothing on paper in that office concerning either of these two things?—A. As far as I know, nothing whatever. My whole study on that subject was had after going into the aqueduct office, where I learned what I could by calling for and reading papers, etc.

Q. Did you find in that office any plan of General Meigs or anything concerning it?—A. No, sir.

Q. I speak of the plan of carrying the water around the hills?—A. No, sir; not in the office; but simply a letter published as a Congressionals document, written, I think, to the Senate Committee on the District of Columbia.

Q. Who was the originator of this tunnel plan that now exists?—A. I presume that Captain Hoxie was. It was suggested by him as the outcome of further study, the development of the plan on which the appropriation was predicated; that is, the original suggestion of passing under Rock Creek by sinking a shaft at each side and passing in tunnel. That simply extended or developed those things in his mind, as well as Major Twining's, into carrying the whole affair in tunnel.

Q. That original suggestion of passing Rock Creek was by a perpendicular shaft on one side and a horizontal drift under the valley, and a perpendicular shaft on the other side rising to the level of the general tunnel or pipe, was it not?—A. Yes, sir; so I understood it from reading the report.

Q. Was that Captain Hoxie's idea? Who invented that notion?—A. It simply appears in his report.

Q. This present outcome, as regards the plan or *modus*, was, if I understand you, a development of that first idea of getting across Rock Creek?—A. I think so. That is what I understand.

Q. This plan, as finally commenced upon, was yours as a fact, not as

the originator of the idea, but you finally reported to the Chief of Engineers, as I suppose?—A. Yes, sir; as administrative officer for the work to which I had been assigned.

Q. What led you to adopt that plan rather than the plan identical with or analogous to that which existed for bringing water down from Great Falls to the present reservoir; that is, keeping as near the surface as the present conduit does?—A. The irregularities of ground through that section indicated that either a very tortuous line would be required, or considerable excavations and embankments. After considerable investigation the belief that substantially solid rock would be found at a reasonable depth then led to the conclusion that the work could be accomplished more quickly and with more certainty, and would be more permanent than it would to make the more elevated structure.

Q. Did you compute the expense that you thought would attend the surface structure, as I will call it for brevity?—A. Personally I did not.

Q. Did you have it computed in your office?—A. Captain Hoxie made those computations for me. While I have no recollection of any specific estimates presented before me that way, I do remember particularly of his stating to me that under his computation he believed that mode was the cheapest.

Q. Which was?—A. The tunnel method.

Q. As he then supposed it was going to be?—A. As he expected it would be; yes.

Q. Those computations and this work of yours that we are now speaking of were carried on by you in your character as engineer in charge of the water matter?—A. Yes, sir.

Q. Under the War Office?—A. Yes, sir.

Q. As you have been in charge of the business, have you any computations showing on paper what was thought to be the estimated expense of following the surface, bridging the hollows, etc., on the Meigs plan?—A. No, sir; no such papers were preserved that I know of; I have no recollection of having seen any.

Q. Then you are not able to tell us now what was the computed difference in dollars between the surface method, as I will call it for brevity, you understand, and the tunnel method?—A. No.

Q. All you can say is that you understood from Captain Hoxie that the tunnel method, as you supposed it would work out, would be the cheaper?—A. Yes, sir; that was the idea upon which the appropriation was predicated. I will say, further than that, that I received a note from one of the members of the Senate committee by which that bill was prepared, stating that it was the intent in appropriating this money that it should be on the basis of the Twining plan.

Q. Was that before or after the bill became a law?—A. That was after the bill became a law and after I was assigned to that duty.

Q. Who was that Senator?—A. Senator Harris.

Q. Have you that note?—A. I have not; I can not find it; I have done everything I could do to find it, but can not; so that I can only speak of it as a fact that had some weight with me in my determination of the matter, so far as the tunnel plan was concerned.

Q. So that, so far as you were concerned, in finally adopting and recommending the tunnel plan, you were not influenced altogether by the idea that from an engineering and practical point of view it would be better than the other, but you were also influenced by the idea that you understood that Congress, on account of the peculiar sum appropriated for some other reason, and by what Senator Harris wrote you, that Congress intended that the tunnel plan should be followed?—A. I gave that idea

whatever weight it had in my mind; but I do not want the other part to be assumed; that I did not believe at the time I recommended it, from such study as I could give it, that it was presumably the best plan. It was the best plan that I knew of to recommend.

Q. My question did not imply any such assumption. My question was whether or not you acted exclusively upon your notion of the engineering value of this computation or whether you were influenced by what you have referred to in regard to the wishes of Congress in passing that law. I understood you to mean that you did both.—A. I did both.

Q. Please tell us briefly and in a condensed way precisely what the plan you recommended was, as you then looked at it and before you had entered upon this work.

The WITNESS. That is, referring to the extension alone?

The CHAIRMAN. Yes; beginning at the distributing reservoir.

The WITNESS. The precise plan was to sink a connecting shaft closely adjoining the old distributing reservoir.

Q. Perpendicularly or at an incline?—A. Vertically, to such a depth as would bring us to good rock; rock such as was hard to drill and that promised to be a solid structure.

Q. To what depth did you expect to have to go?—A. I should have to refer to the profile in the office indicating those items; I can not pretend to carry those figures in my mind. My impression is that it is about 90 feet. The original profile, as designed, shows those depths on which it was actually constructed.

Q. (Handing witness papers.) What do those papers show in that regard?—A. It would be 85 feet as indicated there.

Q. Is this about the substance of the original sketch?—A. No; all these shafts are somewhat deeper.

Q. I mean does this picture show it about as it was then?—A. Yes, sir; this is an outline of the tunnel in vertical sections.

Q. Is it the outline of the tunnel as it was finally worked, or as you first expected?—A. As it was finally worked.

Q. Have you a drawing of the shaft, the original sketch, as you expected it would be?—A. I can furnish a tracing; but that was never published.

The CHAIRMAN. I wish you would please make a memorandum to send us a tracing of the original profile, connected, I presume, with your report and recommendation.

Q. That report of yours was made to the Chief of Engineers about what time?—A. There was a preliminary report setting forth that general plan, made in the fall of 1882, I should say in October.

Q. Is that report in print?—A. That is in print, in one of my reports. The project, as set forth then, was provisionally approved, subject to such further investigation as might tend to develop the supposed existence of sound rock along the line.

Q. Does that provisional approval appear in print?—A. That is also in print.

Q. Who was then Chief of Engineers?—A. General Wright. The final plan was not approved until the following year, 1883; that approval is also in print.

Q. The approval of General Wright?—A. The approval of the Chief of Engineers and of the Secretary of War.

Q. Did General Wright cause any investigation or inquiries to be made, other than your own report, in regard to the feasibility of that plan?—A. I do not know what inquiries he caused to be made; he caused no official inquiry in the nature of a board.

Q. That is what I mean. There was no board or anything of that sort?—A. There was no board.

Q. Who was Secretary of War at that time?—A. Secretary Lincoln.

Q. Did you, either in your preliminary or final report to General Wright, take into view and present to him the alternative methods that might be resorted to, such as the iron pipe of General Casey's idea or the circuitous surface idea of General Meigs?—A. No, sir; only in a general way. I think I expressed the opinion in the report that the tunnel plan would be better than a surface aqueduct; I think I made use of such an expression; but the question of an additional main 36 or 48 inches in diameter, as contemplated by Colonel Casey, I made no reference to, believing that the directions contained in the act for the extension of the aqueduct between those two points left that element entirely out of consideration.

Q. But I understood you to say that the scheme of the tunnel was in existence before the bill passed and it was to the fact that it did exist that the bill really had reference?—A. Yes.

Q. In getting up this scheme did you take into view, any further than you have already stated, the matter of this surface conduit?—A. Yes, sir; I took under consideration and discussed the question of making a surface aqueduct.

Q. That you have stated; and you thought the objections to it were the circuitousness and existence of bridges, embankments, etc.?—A. Yes, sir.

Q. Did you make any survey or reconnaissance with instruments, following around the contours of the hills, where, if it were to go at all, such a conduit would go?—A. No, sir; I made no such instrumental survey.

Q. Did you estimate with substantial accuracy how much such a conduit would cost?—A. I made no instrumental survey, only a reconnaisance, in fact, by going over the ground. It was my understanding, and the understanding that had generally been accepted in previous examitions, that a surface conduit through there on the line of the old line would be quite an expensive and difficult construction.

Q. From whom did you understand that?—A. I derived that from what I read. I remember in connection with that some report on the subject by General Meigs, which I read, in which he spoke of the extension by tunneling from the old reservoir to the heights beyond the Boundary. His tunnel, however, I think did not contemplate going down to a considerable depth where there would be pressure.

Q. His tunnel was a flowing tunnel, in short?—A. It was to have been a flowing tunnel.

Q. Could you give us a reference to that document or paper of General Meigs upon that subject?—A. Not by recollection now.

Q. Could you find it?—A. I think I can. It is possible there may be a reference to it among these papers here.

Q. You need not stop to search for it now. This scheme, then, having been adopted on the plan proposed by you, at what time did the work actually begin? State with substantial accuracy, if you do not remember exactly.—A. I think the contracts were made in October, 1883.

Q. For what were those contracts of October, 1883? Are those the ones of which we have copies, made with Beckwith & Quackenbush?—A. Yes, sir.

Q. Before we go on with what has actually been done, and to take it chronologically, the contract with Beckwith & Quackenbush was made,

as these papers show, after a regular advertisement for bids or proposals—whatever you call them—and after several bidders had put in their proposals?—A. Yes, sir.

Q. It has been represented to us that there was something erroneous or unjust in the awarding of the contract to Beckwith & Quackenbush, as distinguished from the proposal of somebody named Deweese, I think, or Deweese and somebody else. We wish you would explain that to us, how the proposals, on their face, and saying nothing about any question of irregularity in form or method, appeared, as regarded the prices, to compare with the proposal of Beckwith & Quackenbush.—A. The bid of Deweese & Co. was the lowest of all presented.

Q. Which was the next lower?—A. Under the method of computation adopted, Beckwith & Quackenbush were the next lower; that is, it resulted in that. There was an unknown element entering into the computation of the total amount on the bids; that was the amount of lining to be done. Therefore, in advertising, it was stated, in relation to the amount of brick, concrete, or packing required on the lining of the tunnel, that the amounts were unknown, but that certain amounts would be assumed in computing the bids for an award. The assumptions made were of certain proportions between the three ingredients constituing the proposed lining. Exactly what those proportions were I do not now remember, but they are stated in the letter sent to the Chief of Engineers accompanying the abstract.

Q. This first unknown element was equally as applicable to one bid as another, was it not?—A. It was; but applying the proportion to a certain number of lineal feet of lining to be placed, say one-fourth would be brick, one-half dry stone packing, and the other one-fourth concrete. I put that as an illustration. Then take the different prices for brick, concrete, and packing, and apply those prices to these several proportions. Those prices that gave the greatest amount of lining were determined to be the cheapest; that is, that after excavating a tunnel of such a length the bid that admitted of placing the greatest amount of lining was believed to be the lowest bid. In that way Deweese's bid was found to be the lowest, and Beckwith & Quackenbush's the next lower.

Q. (Referring to page 2306 of report of Secretary of War, second session Forty-eighth Congress.) Now, we will begin at the beginning of the tunnel. The first heading is: "Excavation in tunnel, 64,000 cubic yards." Deweese & Co.'s bid was $6.74. I suppose that means per yard?—A. Per cubit yard.

Q. Eugene Robinson's bid was $7.78; Beckwith & Quackenbush's was $8; and then follow four others that were above that. For present purposes we will confine ourselves to these. Then the bids under the next heading as regards those three, "Earth excavation in shafts, 1,500 cubic yards," were: Deweese, $6.25; Robinson, $5.60; Beckwith & Quackenbush, $6. The next heading is, "Rock excavation in shafts, 1,200 cubic yards": Deweese, $12.40; Robinson, $16.24; Beckwith & Quackenbush, $10. The next head is, "Brick masonry, amount unknown": Deweese, $10; Robinson, $12.80; Beckwith & Quackenbush, $14. The next head is, "Concrete masonry, amount unknown": Deweese, $5; Robinson, $8.55; Beckwith & Quackenbush, $5. The next heading is, "Dry-stone packing, amount unknown": Deweese, $2; Robinson, $1; Beckwith & Quackenbush, $2.50. The next head is, "Brick masonry and shafts, 250 cubic yards": Deweese, $12; Robinson, $16.70; Beckwith & Quackenbush, $18. Now there were two instances in which Beckwith & Quackenbush were below Deweese?—A. Yes, sir.

Q. And those were "Earth excavation in shafts," where he was 25 cents per cubic yard below, and "Rock excavation in shafts," where he was $2.40 below?—A. Yes, sir.

Q. While he was under all the other heads considerably above?—A. Yes, sir.

Q. I wish you would state again, if you can, how you figure it out that the Beckwith & Quackenbush bid was better for the Government than the Deweese bid.—A. There was no such figuring made. The bid of Deweese was rejected for other reasons, not as a question of relative value of the bid, but for reasons stated in a communication to the Secretary of War relating to the facts as there stated, which were believed to establish their total irresponsibility as bidders. That communication to the Secretary of War I presume has been placed on your files.

Q. Has that been printed?—A. No, sir; that was never printed, so far as I know.

Q. Who made that communication?—A. I made that communication to the Chief of Engineers in transmitting the abstract of bids and the copies of each bid received, together with the bonds and all the papers.

Q. Was there anything the matter with the Deweese bid on its face?—A. Yes, sir; on its face there were a number of matters, the details of which I have forgotten now. They are fully stated in my memoranda at the time. They were only reasons that were apparent to me as to why I should make that recommendation. I remember there were faults about the bid itself, as to the manner in which it was signed; and there were discrepancies in the signatures to the several bids that were received. I think there was some radical and fatal defect; I think that was in relation to their bidders' bonds for security as to their entering into the contract provided the contract was awarded; and I think in several particulars there was failure to comply with the requirements in the way of instructions to bidders, etc., which in themselves would not have been considered fatal faults by any means. Failure to comply with some of the instructions to bidders would not be assumed under any circumstances as being fatal.

Q. How much lower on the whole work, as you then looked at it and as you expected the work was going to be, would the Deweese bid have been than the Beckwith & Quackenbush?—A. It was in the neighborhood of $80,000.

Q. On an expenditure of how much?—A. So far as those bids were concerned, out of an expenditure of about $550,000.

Q. The right was reserved in your advertisement, was it not, and in the instructions to bidders, to reject any bid, good or bad?—A. Yes, sir.

Q. If, then, you had found the Deweese bid so much better in substance for the Government, although it was irregular and informal, and the bond was out of tune, it would still have been competent for the Secretary of War to waive that?—A. I do not know to what extent the powers of the Secretary would go in that respect. I should assume that he could waive defects.

Q. It certainly would have been competent for him to reject all the bids and advertise again, would it not?—A. Oh, undoubtedly.

Q. Why did you not recommend that?—A. Well, I did not believe there was any purpose to be accomplished in doing that. I was convinced that these bids were not honestly made. I believed them to be fraudulent bids. I believed it to be a firm that had been gotten together for the purpose of bidding on the work, and that they had no qualifications whatever to undertake the contract.

Q. Who told you so?—A. I arrived at that idea mainly by conference with Mr. Deweese himself, personal interviews with him.

Q. Had you known him before?—A. I had never known him before.

Q. What was his place of residence at that time?—A. I think on the face of the bid he gave his residence as Washington.

Q. Otherwise you did not know?—A. I did not know anything about him.

Q. Do you know where he is now?—A. No, sir.

Q. What did he tell you which led you to suppose that he was an irresponsible person, and sham, in short, as you have stated?—A. Among other things, the most convincing matter to me, as I recollect it now, was that when I asked him what plant or machinery he was provided with, as required by the advertisement (which was to the effect that they must satisfy us as to their having a plant), he said he had none, but he could arrange to get it. Then I asked him as to where this plant and machinery could be seen, and he gave me the address where it was, but where that address is now I have forgotten; my recollection is that it was some Chicago firm; I simply speak from recollection, because I have not refreshed my memory about it. He gave me the name of this contracting firm whose plant he intended to use. I telegraphed this firm to ask them, and they said they had made no arrangement, and did not know Mr. Deweess in fact. My recollection is that the telegram was to the effect that they did not even know Deweese & Co. However, it was an emphatic denial that Deweese & Co. had any right to claim the use of their machinery or plant.

Q. They did not say that they had not any such machinery as Deweese spoke of?—A. I do not think so.

By Mr. RYAN:

Q. Did you preserve the telegram?—A. It must be on the files of the office.

The CHAIRMAN. I wish you would get together any correspondence that you had by telegraph or otherwise on that subject.

The WITNESS. I think there is nothing but my own telegram to those people.

The CHAIRMAN. You have their telegram and your reply? We would like to see those.

By the CHAIRMAN:

Q. Did you make any inquiries regarding Deweese & Co., other than your conversation with Deweese?—A. Yes, sir; there were inquiries going on for several days, conducted mainly, I think, by Captain Hoxie I think it was in the neighborhood of a week after the receipt of the bids before any recommendation was made.

Q. Did you make any other inquiries yourself?—A. I know I made a good many personal inquiries at the time. I have no record of them.

Q. Can you remember anybody you inquired of concerning this man?—A. No; I can not recall any.

Q. Who were his coadjutors, his partners?—A. I do not remember their names at all. Those will appear in the papers.

Q. Did you make any inquiries concerning the other gentlemen?—A. I had inquiries made, I remember, to determine their responsibility; I inquired in regard to the names on the bids of those who resided in Washington.

Q. Who were the people on the bonds?—A. I do not remember; my only recollection is that the only one I made any inquiry of in connection with that was Mr. Deweese himself.

Q. These bidders' bonds, filed with the bids, were simply bonds that they would enter into a contract and give good bond?—A. Yes, sir

Q. I see this bond is made by J. G. Dale, of Tionesta, Pa., and W. J. Green, of Washington. Did you know either of those persons?—A. No, sir.

Q. Did you make any inquiry in regard to who they were?—A. I have forgotten whether any inquiry was made in regard to them or not; I can not recall; I can only say that I made such inquiry at that time, with such means as were accessible to me, as to convince me that the interests of the Government required me, in the discharge of the responsibilities put upon me as an officer in discharge of the work, not to recommend them, and I made this recommendation from the best information I could get and from such inquiry as I could make.

Q. But have you any recollection now that you then ascertained or believed that the signers of the bidders' bond of Deweese & Co. were irresponsible persons, or did your rejection of that bond depend upon what you learned concerning Mr. Deweese from himself and otherwise?—A. My recollection is that it depended upon the belief that the firm itself was not a proper firm to do the work, regardless of the bond. That is my recollection now.

Q. Now, how about Robinson, who, I see, stands in your abstract here, on page 2306 of this executive document (part 2, 48th Congress, second session), as a bidder in the order of lowness; how did you get rid of Robinson?—A. I did not get rid of him. I suspect that came from computation in relation the amount of lining that might be placed in the tunnel.

Q. Have you any recollection that Robinson was thought to be a bad fellow?—A. No, sir; on the contrary, so far as I know.

Q. I see under the first head of particulars that Robinson's bid was $7.78 per cubic yard, and Beckwith & Quackenbush's was $8; that under the second head Robinson's bid was $5.60, and Beckwith & Quackenbush's $6; that under the third head Robinson's bid was $16.24, and Beckwith & Quackenbush's only $10, much lower that time; that under the fourth head Robinson's bid was $12.80, and Beckwith's $14; that under the fifth head Robinson bid $8.55 and Beckwith & Quackenbush bid $5, which is much lower than Robinson's; that under the sixth head Robinson bid $1, and Beckwith & Quackenbush $2.50; that under the seventh and last head Robinson bid $16.70, and Beckwith & Quackenbush $18; and then we go down on the same page and we find that Robinson's bid for concrete masonry was $13.75, and the bid of Beckwith & Quackenbush was $5; there is a difference of $8.75; that on dry stone packing Robinson bid $2.25, and Beckwith & Quackenbush $2.50; that under the head of "Air shafts" Robinson bid $2.25, and Beckwith & Quackenbush $15. Now let me ask you, right there, whether your attention was attracted to the enormous difference between the bid of Robinson of $13.75 for concrete masonry, and Beckwith & Quackenbush's bid of $5?—A. I think it is possible that my attention may have been drawn to it at the time; it is very natural that it should have been; very natural that I should have noticed that difference.

Q. What would it lead you to infer; that Robinson did not know what he was doing, or that Beckwith & Quackenbush had for a purpose put that particular head of bid clear down below what it would cost?—A. I could see no reason why that bid should be put down particularly low; it did not constitute to any extent an unknown element; it was only a small item, only 600 yards, and there was no special reason why he should anticipate that he could derive any advantage from it.

Q. What would be a fair price for that kind of work, in your judgment?—A. I think in the neighborhood of $5 or $5.50.

Q. Now let us take a comparison of the air-shafts, 420 linear feet, on those Robinson bid $2.25, and Beckwith & Quackenbush bid $15; how do you account for that enormous difference?—A. I do not account for it, only by the belief that it was looked upon as rather an immaterial item. I do not think Mr. Robinson or any one else could put those shafts down at that rate per foot and make a profit.

Q. What would be a fair price?—A. Well, I suspect that in ground such as it was actually put through, $3 or $3.50 would be the cost.

Q. Now, explain to us on what principle, taking it altogether, Robinson's bid was rejected?—A. Because the computations made showed that we could, by paying out the amount under the known or substantially known items, have 8,455 cubic yards of lining under the bid of Beckwith & Quackenbush, and only 3,720 under the bid of Robinson. That was the only point with reference to which the award was determined.

Q. That is, the bids of Beckwith & Quackenbush, in respect of their known and definite quantity stated, were lower than the bid of Robinson. Do you mean that it would leave you more money for the lining, which was the unknown quantity?—A. No, sir; but the prices bid for the several components of the lining, in the proportion that it was assumed they would be used, enabled more lining to be placed with the balance available for placing lining, by accepting Beckwith & Quackenbush's bid than by accepting Robinson's bid.

Q. Now I understand you. On the lining Robinson's bid was $12.80 against $14 of Beckwith & Quackenbush for brick-masonry?—A. Yes, sir.

Q. But for concrete Beckwith & Quackenbush's bid was $5 against $8.55 of Robinson?—A. Yes, sir.

Q. On the dry stone packing Robinson's bid was $1 against $2.50 of Beckwith & Quackenbush?—A. Yes, sir.

Q. By computing what you thought to be the probability of the various classes of that lining which you would want, you could get more done on Beckwith & Quackenbush's bid than on Robinson's?—A. That was the result of the computations and the belief entertained at the time, as stated in the specifications of the preliminary estimate looking to the lining being of concrete.

Q. But at that time you had not any tunnel to line?—A. We anticipated that there necessarily would be a certain amount to line.

Q. Tell me what was the state of the tunnel itself at that moment of time.—A. There was no tunnel.

Q. So that the particular kinds of lining, more or less, that would be wanted were purely speculative and problematical?—A. Entirely.

Q. So that it would have been within the power of anybody that wanted to to speculate on the probabilities of lining in such a way as to make Robinson's bid the best?—A. Unquestionably a person could speculate in that matter.

Q. Did Deweese make any complaint to the Secretary of War or anybody that his bid had been rejected?—A. I have seen it stated that he did; so far as I know or recollect I have no recollection of any complaint being made at the office, or having been told that complaint was made at headquarters.

Q. You were never called upon by the Secretary of War or the Chief of Engineers to make any explanation about it, were you?—A. To the best of my recollection nothing was ever said about it beyond the report.

Q. What means did you take to ascertain the responsibility and capacity of Beckwith and Quackenbush?—A. At the time they came to the office to apply for bids they represented either to Captain Hoxie or myself what work they were doing and where they were engaged.

Q. Did you know them personally before?—A. No, sir; I had never heard of them, so far as I know.

Q. Do you remember yourself making any inquiry of them, as you did of Deweese, as to where and what their plant was?—A. No, sir; I have no special recollection of that. I have no recollection of entertaining any suspicion in relation to them. I recollect that after the advertisements were issued they came to the office and made very considerable studies in the office, so far as drawings were concerned, and went over the ground of the requirements of the advertisements, bids, etc.; where they had been at work before that there was nothing represented against their work. As required by the advertisements, they established prima facie evidence of their capacity to do the work.

Q. That is, they said so?—A. Yes, sir; they said so, and I do not remember what further was said. I know that, so far as they were concerned, and so far as I know of the others, there was nothing that failed to established prima facie evidence of their capacity, both financially and otherwise, to do the work. The contrary was the case with Deweese.

Q. Do you remember where they told you their plant was established?—A. I think their plant at that time was somewhere on the West Shore Railroad in New York, or had been there, in connection with the tunnel under West Point. I knew of their having done work there.

Q. Had you heard of them before?—A. No.

Q. Did they bring any letters to you?—A. No, sir.

Q. Or communications from anybody?—A. I have no recollection of any.

Q. So that all you had to go upon in respect of deciding between Deweese and Beckwith & Quackenbush was really the appearance of the two sets of men, your inspection of them, and what you heard from Captain Hoxie?—A. Oh, no, sir; I had the conditions of the bids themselves; the evidence carried on the face both of their proposals and the bonds which they submitted.

Q. What was the matter with this Deweese bond? You say you made no inquiry, and do not know anything against the validity of that bond.—A. I have forgotten now what the defects were; they appeared on the face of the bonds—the different copies.

By Mr. RYAN:

Q. Were they defects of form?—A. I hardly know what the bond was. As I recollect it, I stated that the bond appeared to be fatally defective, requiring nothing from the bondsmen; I think I stated something to that effect. There were some parts not only struck out but other parts not filled in to state what the purpose of the bonds was. I know I examined them very carefully at the time.

By the CHAIRMAN:

Q. Look at that bidder's bond, which comes from your office, I suppose, and which is attached to the Deweese bid. I think, if that is a correct copy, I can suggest one difficulty: The bidders were Deweese & Co., and there are Dale and Green who were the bondsman. There would appear to be this one defect in the bond signed by Dale and Green, that they do not refer to Deweese & Co. at all, but only say that they,

Dale and Green, have made a proposal, which was not true. There was no proposal from people of that name.—A. No, sir; the proposal was from the other party. I think that was one of the points. I think I expressed in my letter that the bidders are bonded to do nothing under their bond.

Q. Did you see Deweese at the time the bids were opened, or afterwards? In other words, did you ever have any conversation with Deweese on the subject of his bid not being accepted, or call his attention to this defect in the bond?—A. I think that I must have called his attention to the defect when I met him. It was after the opening of the bids that I had my first interview with him.

Q. You think you called his attention to the fact that the bond did not connect itself with anything?—A. I can only say that I should think I must have done so.

Q. Have you already said that you considered that the prime reason for your recommending Beckwith & Quackenbush against him was the fact that, on an interview with and an examination of the man himself, you became satisfied that he had not any plant or any capacity or responsibility to go on as the advertisement and the regulations required?—A. That their firm was not a responsible firm as represented by him. I became fairly convinced of that.

Q. I believe your regulations and advertisement required that the bidders must be persons actually accustomed to that sort of business, and that they have the plant necessary to do the work, and so on?—A. Yes, sir.

Q. The point of that being that you did not want to have speculative bids?—A. That was the whole purpose. I wanted no trifling with that work; I wanted to assure, as far as possible, qualified bidders.

Q. How soon after the contracts were made with Beckwith & Quackenbush did they actually begin the work?—A. I suppose that appears in print, but they commenced promptly; they commenced within a few days to get the machinery in.

Q. And that was in the fall of 1883?—A. That was in the fall of 1883.

Q. Did they commence at more than one place?—A. They commenced at several working shafts; I have forgotten which one first, but they commenced at all of them substantially at the same time.

Q. At how many points did they commence working?—A. They commenced at five points within a period of two or three months.

Q. Beginning at the west end and coming this way, in that order, just describe where those five points were.—A. A few feet from the northeast corner of the old reservoir, across the Conduit road, is where the west connecting shaft was sunk. The next point was in the Foundry Branch valley, near the crossing of the New Cut road, so called. The next was in the tunnel crossing at Rock Creek, opposite Oak Hill Cemetery, near Lyons' Mill; that is called the Rock Creek shaft. Then the next was to the west of Champlain avenue, a short distance north of Boundary, known as the Champlain Avenue working shaft. And the next was the eastern or Howard University shaft, which terminated the tunnel at the eastern end.

Q. How long after this work was commenced was it that you discovered, if you did discover, that these shafts had to go deeper than you had supposed, in order to reach the kind of rock you were willing to go on in?—A. I presume it must have been in the spring or early summer of 1884; I think it was along about that time.

Q. Which shaft was it where, when you, having got down to your contemplated line, found it would not do?—A. It was either Rock Creek

or Foundry Branch, I have forgotten which of those; it was one of the shorter shafts that reached the designated limits. The excavation was continued a few feet further, I do not remember the number, until the quality of the rock taken out seemed to warrant the commencement of the tunnel drift.

Q. Have you any reports or statistics which show exactly how much deeper you had to go at each end of the shaft than you had contemplated?—A. Yes, sir; there was a special report I made to the House Committee on Appropriations in the winter of 1886, I take it, in which that matter was considered.

Q. Was it the winter of 1886–'87 or 1885–'86?—A. 1885–'86.

Q. Was that a letter addressed to the committee, or a report through the Secretary of War?—A. I think it was addressed to the chairman or the chairman of a subcommittee.

Q. Is that in print?—A. I think not, unless it be printed in connection with their report on the deficiency bill that year. There was a report made that year, and whether that part of it was printed or not I do not know.

The CHAIRMAN (to Mr. Ryan). Was that Mr. Burnes's report?

Mr. RYAN. I think so.

The WITNESS. That question was under discussion, and I think I made a report. It is possible also that I may have testified at that time.

Q. Going back to the west end; did you find in the spring of 1884 that that shaft had to go any deeper?—A. My recollection is that all the shafts were carried somewhat deeper than was indicated on the original project sent to the Chief of Engineers.

Q. Beginning at the shaft at the west end and coming down to where you started your drift, if that is the correct name of it, and having started the drift, did you find good rock?—A. My recollection is that that drift was started in unsatisfactory rock.

Q. Is there anything in writing from you, or from whoever was in charge of the work under you, in the year 1884, and immediately after you had found that you must go deeper, and that having gone deeper, the rock was still not entirely satisfactory, made to the Chief of Engineers announcing that fact?—A. No, sir; I never made any. It was not until after we had gone some distance in the rock at each point where we started that we thought the rock was of good quality. At each working shaft where we started we believed that we had reached a good quality of rock.

Q. Having turned the westward drift, coming east, did you not almost immediately find that the rock was bad?—A. We found bad rock at the foot there.

Q. That was early in 1884, was it not?—A. That was early in 1884.

Q. Did you report that fact to the Chief of Engineers?—A. I do not think I did; I have no recollection of it.

Q. You must have done it at some time, did you not, because the fact was that the work was not going on as you contemplated; that is, you did not find the situation to be what you had supposed?—A. The facts as to the work were reported monthly to the Chief of Engineers. I do not know whether the fact was stated each month, or not, as to the character of the rock.

Q. Those monthly reports were in writing, were they not?—A. Yes, sir.

Q. Are they in print?—A. No, sir.

The CHAIRMAN. I wish you would bring to the committee to-morrow

and produce the monthly reports. General Casey will give them to you without our sending him formal notice for them, undoubtedly. I suppose they are in his office, and not yours?

The WITNESS. Yes, sir. You want the originals?

The CHAIRMAN. The originals, because it will cause considerable delay and expense to copy them. Bring those monthly reports on the subject of this tunnel, commencing with the commencement of the work, in the winter of 1884, and continuing through the whole year 1884. Take a dozen of them to begin with.

Q. Now, we will go on with the tunnel proper. You soon found that at the west end early in 1884, when you turned your drift, the rock was not satisfactory; not what you expected?—A. At that point; yes, sir.

Q. Did you find it so in turning the drift at any of the other points?—A. No, sir; my recollection is that we started in that west drift before getting down to solid rock, because we were working in very good solid rock in the Foundry Branch shaft, and supposed that by the descent of the grade of the drift itself from that point we would soon reach that same kind of solid rock that we were working in at the Foundry Branch working shaft.

Q. How far off was the Foundry Branch shaft from the western shaft?—A. About 2,500 feet.

Q. How far did it turn out that the bad rock continued from the west end?—A. I think we lined something in the neighborhood of 100 feet before we stopped lining in that shaft. The operations at that shaft as a working shaft were then discontinued and the balance of that drift was run from the Foundry Branch shaft.

Q. Why did you discontinue there?—A. Because in the bottom of that shaft the grade of the tunnel was descending in such a way that the water would not drain to the end. We had naturally to make a descent down to the valley of Rock Creek. It had never been intended to be used as a working shaft.

Q. When you stopped at the end of 90 feet had you got to solid rock that would not require lining?—A. Apparently, yes; my recollection is that we went as far as there appeared to be any necessity for lining.

Q. Now, take Foundry Branch shaft. Did you go any deeper there than you originally planned?—A. Yes, sir; we went deeper.

Q. And having gotten to where you turned your drift, how far did you carry your drift before you came to bad rock?—A. I can not give the distance. The work had progressed a number of months, though, before there was any suspicion that any bad rock would be met with. That is fully set out in the printed annual report of 1885–'86, I think; that will develop those features.

Q. When did you first become convinced that the whole course of this rock, taken altogether, was so different from what you had expected it in recommending this tunnel plan?—A. I think in the spring and summer of 1887 was the time that I came to the conclusion that it would be desirable to line the tunnel completely from end to end.

Q. About what proportion of the whole distance of the tunnel had at that time been excavated?—A. The whole tunnel had been holed through from end to end.

Q. So you did not become convinced that the nature of the rock was so essentially different from what you had calculated upon in your original plan as to require so much greater expense until you had got the hole all the way through?—A. With regard to the lining throughout I did not anticipate that, from what we had seen, the rock was so different as to require a more considerable lining than had been anticipated

as early as the time the first appropriation was made, in 1886. As early as the time the first appropriation was made in 1886 it became evident that more lining would be required than had been anticipated, but not all through.

Q. But you came to the conclusion in 1886 that the amount of lining required would be enormously greater than you had originally expected?—A. Yes, sir.

Q. Did you take into consideration at that time what would be the additional expense to produce absolute security with this vastly increased amount of lining?—A. Yes, sir; it was taken into consideration in the estimates submitted to Congress as necessary to complete the work.

Q. Did you consider at all the question of whether the public interest would or not be better subserved by giving up the tunnel altogether and seeing whether something else could not be done?—A. No, sir.

Q. You never took that into view?—A. No, sir.

Q. How much water has been pumped out of that tunnel, say, by a monthly average, in round numbers? I suppose you have the exact figures somewhere, have you not?—A. They are approximate figures. There never has been any actual measurement of the amount. In general terms it may be spoken of as a comparatively dry tunnel. It is very easy work for the pump to keep the tunnel cleared so that a passage from end to end may be maintained.

Q. How long did it take you, when the tunnel was once filled after work was stopped, to pump it out?—A. It took about a month; it took some of that time in making the preparatory arrangements; the pumps were not in good order; but we could have done it in a month.

Q. When the tunnel was what we call full of water where was the level of the water at the west end?—A. I do not remember what it was, by any measurements, but judging from recollection and the slope of the tunnel—

Q. The lowest working shaft was at Rock Creek, I suppose?—A. The lowest working shaft was at Rock Creek.

Q. Did it rise to the outlet there?—A. Yes; it rose to the outlet there. There are certain irregularities in portions of it, so that it could not drain through all the intermediate distance and get out.

Q. But before you began pumping at all the highest point where the water would be would be the outlet at Rock Creek shaft?—A. Yes, sir.

Q. And that was a depth of about how far from the top of that shaft to the bottom of the tunnel?—A. I think that was about 60 feet.

Q. Who were your assistant engineers in actual charge of the work from the time these contracts were let? Who was under you?

The WITNESS. The engineer officer assistants, do you mean?

The CHAIRMAN. Yes.

The WITNESS. For a short time Captain Hoxie was in immediate charge there, but followed very quickly by Captain Symons.

Q. How long a time was Captain Hoxie in?—A. Well, I think that I assigned Captain Symons in the early months of 1884. I remember that I made special application to the Chief of Engineers, stating my reasons for asking for an additional assistant to put in immediate charge of this work, stating substantially that neither Captain Hoxie nor I, in view of our duties at the Engineer's office, could give that undivided attention which that work required.

Q. Captain Hoxie was still in the Engineer's office too?—A. He was there also. He was simply assigned to me for additional duty, to report to me as the officer in charge of the aqueduct, after I had been assigned

to that duty, to aid me, in response to an official request which I addressed to the Secretary of War or Chief of Engineers.

Q. Captain Symons then took actual and physical charge of the work about when?—A. I should say in January or February, 1884; I have forgotten now which month. I could furnish the order assigning him.

Q. How often did he report to you, regularly I mean?—A. He reported to me daily. I saw him somewhere daily.

Q. Those were verbal reports?—A. Yes, sir.

Q. But how often did he make official or written reports to you?—A. I think only once a month he made written reports, and I think those were more in the nature of pencil memoranda. I do not remember, in the early part of his duty there, of his writing any formal report to me.

Q. Was there any other engineer officer in charge at the same time that Captain Symons was? Was Captain Hoxie entirely relieved, or was he still retained?—A. He was not formally relieved, but he ceased very shortly to take any active interest in the work.

Q. Had he any further responsibility about it?—A. No, sir.

Q. It all stood, then, between yourself and Captain Symons?—A. Yes.

Q. Captain Symons was subject to your direction?—A. Yes, sir.

Q. What was Captain Symons to do actually? What would be his daily duties in connection with the work?—A. His daily duty was to go from point to point where, in his judgment, it was necessary, to see how the work was going on; to take active supervision of the work. As the executive officer in immediate charge of the work he was assigned to the active work of superintending the construction of the tunnel.

Q. What would be the duty of an executive officer to do from day to day in that connection?—A. It would be his duty to see that the proper agents were employed; to be daily on hand and supervise the work; to keep watch of the work, and to see that the interests of the Government were protected, the work being done by contract; it would also be his duty to be on the ground as frequently as possible in connection with his other work to see for himself the exact progress of the work; to give such instructions to the contractors as would insure, as far as possible, the carrying out of the requirements of their contract, and to keep himself advised, by direct contact with the work, so that he knew personally from his contact with it what the condition of the work which he was superintending was from day to day.

Q. It would not be a part of your daily or weekly duties, then, if I understand you, to go there yourself and actually see what was doing?—A. No, sir; to do that would have been absolutely incompatible with the duties to which I was assigned. I had other responsibilities devolved upon me at that time with reference to other public works in connection with roads, sewers, and water-pipes.

Q. That was on account of your being Engineer Commissioner?—A. Yes, sir. So far as the other work was concerned, it extended to Great Falls, and consisted of several different features. The work at that time in fact covered most critical work at the dam at Great Falls. That is work requiring great care and attention on the part of the engineering establishment.

Q. Down to the time that Captain Symons took actual charge did any difficulty occur except the geological one you have spoken of?—A. No, sir.

Q. The contractors did all they agreed to do?—A. Yes, sir.

Q. In the time they agreed to?

The WITNESS. Up to the time Captain Symons took charge?

The CHAIRMAN. Yes.

The WITNESS. Yes, sir.

Q. So that when Captain Symons began his duties and Captain Hoxie practically departed, nothing had occurred to give any ground of complaint, criticism, or suspicion, except the circumstance that the rock at the bottom of the contemplated depth of shaft did not turn out to be what you expected?—A. That was all. That was ascertained after Captain Hoxie had ceased to have active connection with the work.

Q. When he left it had not gone down to that point?—A. Oh, no.

Q. When disappointment first began it was under Captain Symons?—A. Yes, sir.

Q. Did Captain Symons report to you from time to time the disappointing appearance of the rock?—A. Yes, sir; under my direction he would bring me samples of the rock from day to day, to show the character of the rock, and it finally reached the point where in our judgment it was proper to commence the drift.

Q. Did the contractors make any complaint that they had to carry the shaft deeper than had been contemplated, and therefore had to get the rock out at greater expense?—A. I think there was some verbal complaint to that effect; I have no recollection of any complaint in writing.

Q. Did the contract authorize you to carry the tunnel to a lower depth at the same rate?—A. Yes, sir; I think so.

Q. It required you to go to whatever depth your experience should convince you was necessary?—A. I think so; it is my recollection of the specifications, in relation to shafts, that it stated that the depths indicated were approximate only.

Q. Did you begin any of the lining before the tunnel was holed through, as you express it?—A. Yes, sir. In the beginning there were several points encountered where the rock was so soft for short distances as to be a source of danger in passing through the tunnel; that is, it required timber to hold up the soft rock. Those places were bricked in or lined rather early in the business.

Q. Was the timber taken out?—A. In parts it was, and in other parts necessarily it was left in.

Q. So that even in those places, before the extent of the bad nature of the rock had been fully discovered, you met places of lining that had no solid packing over and around it?—A. Not solid in the sense of a solid mass of masonry back of the arch.

Q. I am talking of the first lining that you made, where you found the rock was so defective that it had to be timbered to keep it from falling in on the workmen. How long a space was that, the particular one you have just now been speaking of that you had timbered?—A. My recollection is that the first one was about 25 feet long, and then there was another one that was perhaps 50 feet in length.

Q. Where were they?—A. In the west heading of Champlain avenue was one, and in the west heading of Howard University shaft was another that I recollect now; there were several points scattered about.

Q. About how far to those two shafts, the one 25 and the other 50 feet in length?—A. My recollection of the Champlain Avenue shaft is that it was in the neighborhood of 800 feet west from the shaft where this 50 feet of timber was.

Q. Will you describe to us exactly how that lining was put in, how it was made, and what it was composed of?—A. That lining was composed of a brick invert from the bottom of the arch, laid on concrete, that was turned to the shape of the invert; curved side-walls of brick

to the height of about 3½ feet, as shown in a section here, in the general sections, over which there was a brick arch of three rings in some places and four in others.

Q. By a ring of brick you mean the bricks were laid on their narrowest edge?—A. Yes, sir.

Q. You say that arch was composed of three or four rings?—A. Yes, sir; I think at these points to which I refer it was invariably four rings.

Q. I want you to stick now to the 50 feet of timber west of Champlain avenue; what was the thickness of the invert laid on concrete?—A. Two rings, I think; that is my recollection.

Q. What was the thickness of the curved side-wall?—A. Three rings, as I now recall.

Q. How did you get a support for the additional ring of brick when you increased it from two to three?—A. A boring was made in the solid rock. After that they had some special brick molded for making that junction.

Q. What kind of mortar was used in laying up that work?—A. A mortar composed of one part hydraulic cement to two parts of sand.

Q. What cement was used?—A. In part Rosendale cement has been used there; and different brands of local Potomac River cement, such as Shepherdstown, Round Top, and several other brands have been used during the progress of the work.

Q. Where did they get the sand?—A. The sand was delivered at the work by the contractors, and inspected, when delivered, as to its quality.

Q. My inquiry was where it came from?—A. I have no idea.

Q. Sticking right to that particular 50 feet; that was timbered first?—A. Yes, sir.

Q. And then this arch was laid?—A. Yes, sir.

Q. How far was it from the top of the arch to the rocky roof supported by the timber?—A. At this particular place it was in the neighborhood of 20 feet to the highest point; perhaps a little over 20 feet.

Q. A cavern, so to speak?—A. A cavern from the roof.

Q. How was that filled up, if at all?—A. It was filled with timber, the timbers laid crossing each other at right angles originally.

Q. I mean after you had turned your arch and the mortar was set so that the brick-work was complete. What was done then with this cavern over it?—A. So much of the timber as could be removed without injuring it was taken out, and stone packed in to replace it. To what extent the timber was removed I am not able to say, from the fact that I did not see it.

Q. Did you ever see it?—A. Yes, sir.

Q. You have been in there?—A. Yes, sir.

Q. At what time were you there?—A. I can't give the time.

Q. Were you there after the brick-work was done?—A. Yes, sir; I was there before the brick-work was done. I saw it in the condition in which it was when the timber was there before the brick-work had been placed, and I saw it after the brick-work had been placed.

Q. The supporting timbers, I suppose, would be rested on the bottom of the tunnel?—A. Not at the time I saw them. The timber framework had been placed across.

Q. It was not shored up from the bottom, then?—A. There were shores on the sides supporting the horizontal timbers that constituted the roof of the tunnel.

Q. What became of those shores when this brick arch was laid?—A. They stood inside the arch.

Q. Then they had to be taken out as the arch was built?—A. They had to be taken out as the arch was built.

Q. When the arch was built 5 feet, say, what supported the timbers overhead that the shores had supported before?

The WITNESS. While the side-walls were going up?

The CHAIRMAN. Yes.

A. I do not know. I presume they put in temporary frame-work on the sides so that the shores could be removed.

Q. Did you see it after the arch was turned and the brick-work was finished, referring to this particular 50 feet?—A. Yes, sir; I have seen it several times since that.

Q. Did you get up in there?—A. No, I have not been up in there.

Q. Then you have not seen above?—A. No, sir; I do not know of my own knowledge what is in there, from any sight I have had of it.

Q. From what you have heard—to be sure about this particular business—how do you understand that cavity of 10 or 15 feet above that brick-work is now occupied?—A. I understand it to be occupied by a combination of dry stone (such as had been removed from the tunnel) and by masses of timber.

Q. One above the other, the stone supporting the timber, or the timber supporting the stone?—A. The stone packed in the interstices of the timber.

Q. Do you consider that safe work to stand a pressure of 80 pounds to the inch on the inside?—A. I believe myself it would be perfectly safe with the weight that is there, and the water which serves as a counter-pressure on the other side.

Q. That is not quite an answer to my question. My question is whether you consider that work to be adequate to stand a pressure of 80 pounds to the square inch on the inside, saying nothing about water on the outside, but just as it is?—A. Well, I believe it would stand it. I would not want to insure safety as against that inside pressure. I would not want to leave the work in that condition at that point.

Q. You do not believe it to be, as it now is, to the interest of the Government, looking to the public safety, if I understand you?—A. No, sir; I do not believe it is in the condition in which it should be left.

Q. Did you ever say to the contractor at the time of it that that work would not do?—A. No, sir.

Q. Why not?—A. Because I did not know at the time that it would not do.

Q. You saw it?—A. I did not see how the packing was done over the arch; I did not see what was done.

Q. What was represented to you as to the nature of that packing when it was done?—A. About as I have represented it to you, sir; that they had removed as much timber as it was possible to take out, and replaced it by dry packing; and, as represented to me at the time, I believed that the work was sufficiently strong and solid.

Q. I am now speaking about that particular spot. The work there now is just what it was then, is it not?—A. Certainly.

Q. That has not been changed?—A. Not at all.

Q. And yet you are now of opinion that, as regards the public interest and the completeness and safety of that particular work at that particular point, it is not right?—A. I believe it can be made more secure than it is now. I believe it can be made more solid.

Q. I want to get at your view about it, then, in this way: Do you consider, from what actually took place there, that Beckwith & Quackenbush fulfilled their duties under the contract in leaving it in the condi-

tion that they did?—A. If they could have removed any more of the timber they did not.

Q. Then I infer from your answer that if they could not they did fulfill their contract?—A. Yes; if no more timber could have been removed I think they did what was required of them under their contract.

Q. And you would have been bound to accept it as so much work performed?—A. Yes; I think so.

Q. Because it was in accordance with the contract?—A. I am not certain whether that contract absolutely required them to remove any timber, or to remove it where practicable; so that I can not say whether that responsibility devolved upon them or not. If it simply said to remove timber where practicable, then, having gone as far as was practicable, under the opinion of the superintending engineer, they would have accomplished their contract; and if it required them absolutely to take that responsibility then they would not.

Q. Supposing they have done all that their contract called for, then their contract did not call for enough for the public safety? You have already said that it is not in the condition you would leave it, that you would not take the risk of leaving it in that condition?—A. I said I could make it better. I do not consider that it is the best possible.

Q. Do you regard it as safe for the permanent purposes of the tunnel as contemplated?—A. Well, I believe it could be made safe, but I am becoming skeptical on the subject; I would rather leave it in better condition than it is now. I believed it would stand and that it would serve all its purposes, taking all the conditions that surround it.

Q. Do you believe that yet?—A. No, sir; I do not believe it yet. There are so many developments that I have seen in the tunnel of late that I have lost my belief that any one part of it is safe until it has all been examined into.

Q. But we are talking about this particular 50 feet that we know about. I am going on the assumption that every other foot of the whole distance is absolutely impregnable for all purposes. We are just confining ourselves to this 50 feet that you personally know about, and if you had the whole responsibility I want to know whether there is anything that you would think it necessary or proper to be done at that spot.—A. Yes, sir.

Q. Tell us what ought to be done.—A. I think that that part of the tunnel should be opened up again, and retimbered to a sufficient height, and thoroughly lined with masonry.

Q. What do you mean by thoroughly lined? What would you do with that cavity over your tunnel? That is a short way of getting at it?—A. I think the best way to do it would be to open up the arch there again, and allow the tunnel to be filled in and the débris taken out, and the cavity filled in there solidly with masonry up as high as necessary to have it.

Q. How high would that be?—A. From 20 to 25 feet. I do not think it would be necessary to carry that all up in masonry. I think dry packing could be put on the stones, and ordinary masonry could be put in the roof and upper part of it.

Q. If I understand you, you think it ought to be brought by some efficient means into absolute contact with the roof?—A. Yes, sir.

By Mr. FAULKNER:

Q. That would necessitate tearing out the whole of the lining of the tunnel?—A. There are other methods that have been suggested in relation to that point, one of which is to make a new tunnel around it; another one is to make it with an iron section, with plate.

By the CHAIRMAN:

Q. But as to a tunnel around it, what guaranty would you have that you would not strike the same kind of rock?—A. Knowing the existence of that bad seam, greater precautions could be taken in driving it than were taken originally to prevent a fall, such as took place there originally.

Q. That fall was occasioned, then, I infer, by want of sufficient precautions in blasting?—A. I think that contributed to it, and perhaps they did not take sufficient care in the timbering; and not knowing that they had struck treacherous ground at that time, they were not prepared to meet it.

Q. They would strike that treacherous ground gradually, would they not?—A. Yes, sir.

Q. Would you call it good workmanship and in accordance with the contract for the tunnel driver to dash things to pieces in that way?—A. No, sir.

Q. Why did you never remonstrate against that method of carrying the drift?—A. There have been remonstrances as to the danger of too heavy explosives, too large charges, etc.; they will be found among the letters written by Captain Symons.

Q. That brings it to what I was going to ask you next. When did Captain Symons first report to you any imperfection in the transaction of the business beyond the finding, which you have already stated, of unsound rock at a higher elevation than you expected, when you turned your drift? When was the next misfortune or misdoing reported to you in any way, either verbally or in writing?—A. As to misfortune I recall no special report of any misfortune, but from day to day more bad rock appeared, and as it appeared he would speak of it. I do not know of any other thing that would be characterized as a misfortune.

Q. By that I mean, as the other phrase imported, anything going wrong in any respect. When did you first learn that anything was going wrong?—A. I can not give a date as to that. The only other point that I remember as being the cause of more or less complaint was the slow progress in tunnel excavation; such complaints were made from time to time during the first year.

Q. When was the first report made to you, either orally or in writing, as to the contractors using too high explosives and splitting and injuring the rock through which the tunnel was to go?—A. That was only a few months after the excavation in the tunnel had commenced, after they had got their power drill in; I can not locate the date, but I know it was the matter that was spoken of between Captain Symons and myself on several occasions; and I also know it was a matter which he communicated not only verbally but in writing, as I have seen letters on file written by him addressed directly to the contractors.

Q. That implied, of course, on his part an understood misconduct of the contractors in the execution of the work, did it not?—A. I presume it may be characterized as a misconduct; yes, sir.

Q. If the contractors were doing exactly what they had agreed not to do and nothing that they agreed to do, they must have been going not according to the contract, must they not?—A. There was no agreement as to the amount of powder to be used, excepting to do the work in the best way possible.

Q. And under the control and direction of the engineer; was not that part of the contract?—A. To do the work satisfactorily to the engineer in charge.

Q. If using too high explosives and too heavy charges were not satis-

factory to the engineer, then it was against the contract, was it not, and not good workmanship either?—A. Very well; that is true.

Q. Now you say that that thing did actually occur?—A. Yes, sir.

Q. Why did you not dismiss the contractors, then?—A. Because we did not imagine that it was such a breach of the contract as required the annulment of the contract. So far as I know—and I have had experience with contractors—it is my belief that there never was a contract carried out perfectly, in which there was no lapse in that matter in which the contractor did not fail in some respect such as that.

Q. All that you did about the business, then, was to remonstrate?—A. Yes, sir.

Q. Did it occur any more after the remonstrance?—A. The lapses occurred frequently; yes, sir.

Q. You finally got the thing holed, you say; and down to that time, so far as the excavation went, you did nothing in regard to the method of action of the contractors, except to remonstrate from time to time in regard to the unworkmanlike manner in which they were doing the work, using too high explosives, etc?—A. Yes, sir.

Q. And still they went on. Down to that time did you know anything of any subcontract?—A. No, sir.

Q. Where were Beckwith & Quackenbush during the time we are now speaking of?—A. They were here most of the time. Mr. Beckwith was not here as regularly as Mr. Quackenbush. Mr. Quackenbush appeared to be the working manager for the firm. My recollection is that he was here, you might say, constantly.

Q. Do you know where each of the gentlemen resides at this time?—A. No, sir.

Q. Were they in actual superintendence of the work as contractors?—A. Mr. Quackenbush appeared to have the active and immediate superintendence; he had his foreman and engineer, I believe, at the same time.

Q. You did not see anybody that you suspected of being a subcontractor?—A. No, sir; I had no suspicion of any subcontract.

Q. And neither Captain Symons nor Lieutenant Townsend reported anything to you about any subcontractor?—A. No, sir.

Q. I believe Lieutenant Townsend succeeded Captain Symons?—A. Yes, sir.

Q. And neither of them reported having any suspicion that there was any subcontract?—A. I have no recollection whatever of that question being raised in any way or shape.

Q. So that, so far as you knew or heard, the work was going on under the actual direction of the contractors and in the actual execution of the original contract?—A. Yes, sir.

Q. Will you please give us the names of some of those who, you afterwards heard or knew, had subcontracts?—A. There were Brennan, Emory, and Palmer who have had subcontracts, as I have learned by the testimony taken by the court of inquiry at the War Department.

Q. Do you know either of those persons?—A. I know Mr. Palmer.

Q. Who is he, and where does he live?—A. He lives here in Washington somewhere; I knew who he was, he having been a foreman on the reservoir construction before he was engaged on the tunnel this last year.

Q. Do you know either of the other men?—A. No, sir.

Q. Did you ever see them about there?—A. Not that I know of.

Q. When did you first hear of any difficulty in respect of the lining of the work, aside from these two particular spots that you have already spoken of?

The WITNESS. Any defective work in the lining?

The CHAIRMAN. Yes. I do not mean in the mere construction of the brick-work, but in the lining as a completed concern, with its proper backing, etc.; any part of it, leaving aside these two places that you have already mentioned, and which occurred in the course of the drift.

The WITNESS. The question is as to the method of defect of lining?

The CHAIRMAN. Any defect, or anything going wrong, or not up to the contract, or not what it ought to be, in regard to the lining as a thing to hold the water in; and by that I include everything that is behind it or not behind it.

The WITNESS. The first adverse criticism that I heard of as to the method of lining was in the report of the Board of Engineers which was convened to consider the question of the lining of the tunnel, both as to cost and safety; that was a Board that was called in pursuance of the requirement of Congress in making its first supplemental appropriation.

Q. What date was that?—A. That Board was convened in the summer of 1886.

Q. About July or August?—A. About August, I should say.

Q. At that date, August, 1886, tell us how much of that lining that now exists in that tunnel was in?—A. It is almost a guess, but I think it was about 1,200 feet; it was the amount that existed at the time operations were suspended.

Q. You can fix it by the papers?—A. The public record shows what it was.

Q. What record do you mean?—A. The report of the Chief of Engineers will show the amount of lining that was in place on the 30th of June, 1886, for instance.

Q. Where was that 1,200 feet?—A. It was scattered in several different parts of the tunnel.

Q. Part of it was brick and part of it concrete?—A. Part of it was brick and part of it concrete and dry-stone packing.

Q. That would be behind the brick-work or the concrete, would it not?—A. That would be behind the brick-work.

Q. It could not be behind the concrete; it must have been behind the brick-work.—A. Yes, sir.

Q. Down to that time, August, 1886, had it been reported to you, or had you heard in any way, that there had been any failure in the performance of the contract in regard to packing?—A. No, sir; I believed the packing to be done well, so far as any information I had was concerned.

Q. Do you mean that you understood down to that time that the packing had been done according to the contract?—A. Yes, sir.

Q. Down to that time had you visited the tunnel yourself at any time and inspected the method of putting in the dry packing?—A. Yes; I had seen it on one or two occasions, I know; I can not specify them, but I remember watching the work of dry packing going on.

Q. Take the first time you remember of being there yourself when dry packing was done above and around the brick, and tell us what you saw as to the size of the cavity left outside the brick-work, its length on top of the brick-work from the place where they had stopped, if they had stopped, putting in packing, and how far back it was to where they were actually packing in?—A. It would be perfectly impossible for me to give you an idea of the dimensions, it would be simply guess-work.

Q. You have no picture in your mind, which you have retained from any of your visits, which will enable you to tell us just how it looked

at that place, what sort of a place you saw, what sized stones, and how large a place needed filling?—A. I can state, in a general way, that I probably generally saw men standing up on the scaffold, may be 3 or 4 feet from the ground, at work packing stone behind this arch, and reaching over in this way [illustrating] as far as they could reach.

Q. How high would the top of the arch be from the floor of the tunnel? By the top I mean the outside, the crown?—A. The top of the arch where the key comes in was about 9½ feet, I think, if I recollect aright.

Q. What was the tunnel to be in the clear, perpendicular?—A. I think that is about the height of the arch. I have forgotten the figures. It is not circular. It is composed of three different divisions or parts.

Q. I mean from the lowest point to the highest point of the arch?—A. I think it is in the neighborhood of 9 feet.

Q. If you add to that three rows of brick you have about 15 inches more, have you not?—A. Yes, sir.

Q. So that the bottom of the cavity on the very top of the key of the arch, to be filled in with dry packing, would be at least 10 feet above the floor?—A. Yes, sir.

Q. Now, you saw men standing on the scaffold 3 or 4 feet feet high, putting stone up there?—A. I do not think I ever saw them putting it on the key.

Q. They were putting it on the sides?—A. After the arch had been turned, and on the arch; I do not remember seeing the keying process during the dry-stone packing process; I do not recall it at all.

Q. Do you remember how large any of the places were that you did see them filling in with this dry packing on the sides or haunches of the arch?—A. I do not recall a place larger than such as were being filled in by the men from the platform on which they were working; in other words, I do not recall any hole big enough so that a man inside of the hole could work properly.

Q. It would have to be put in by hand from the outside?—A. I have no recollection of seeing any man in a hole.

Q. In that case, then, where the space between the outside of the lining and the rock was so small that a man could not get in it would be essential, would it not, to good dry packing that the packing should keep pace with the building of the brick-work, within a margin of 2 or 3 feet at the very most?—A. Yes, sir; my recollection of that part of the work is that they would run up a few courses of brick, may be seven or eight, and then the packer would go to work and put in his stone on that side, while the brick mason would probably be at work on the other side.

Q. So that if the lining in such places were carried forward to a distance of 5 or 6 or more feet before the packing was put in, it could not be packed back there?

The WITNESS. Longitudinally, do you mean?

The CHAIRMAN. Yes.

The WITNESS. Yes, sir; take the center of the arch open a certain length, and they might run the full length of that center, for instance.

Q. How long was a center?—A. As they are constructed now they are 14 feet.

Q. How long was it then?—A. I think about the same length.

Q. If they get in on the sides there must be space enough on the sides for the man to get in?—A. No, sir; for instance, this [illustrating] represents the length of one center; the brick-work would be up so that a man could stand on the platform, and the stone would have to be taken up here and put through, even if it was 150 feet long.

Q. Yes, but of course you did not put in the crown of your arch until you got your sides, did you?—A. No.

Q. Then I will repeat my question: If the brick-work of the tunnel was projected longitudinally complete, invert sides, haunches, and key, a distance of more than 5 feet, how could you dry pack it in behind there then?—A. You could not after keying up the brick-work; that could not be done. But as long as the work is done over the side of the arch, which is the part I refer to, then I think it could be done.

Q. So that it would be possible, if you were the inspecting engineer, so far as time is concerned, for the workman, if your back was turned for two hours, to project the whole lining longitudinally far enough and put in packing in front that would appear to be solid, but still leave a space behind?—A. Unquestionably.

Q. It follows from that, does it not, then, that a proper inspection by the engineer, or inspector, or somebody, in order to know that the dry packing was put in all around, would make it necessary to watch it all the time?—A. Yes, sir.

Q. Mr. Faulkner suggests this question: What kind of stone was used for this dry packing?—A. Selected stone that was excavated from the tunnel.

Q. It was the same rock that had been taken out of the drift?—A. Yes, sir; from certain parts of it, and it was inspected before being used.

Q. Did you take the hardest part? Was that the theory?—A. Yes, sir.

Q. What was the nature of that rock?

The WITNESS. You mean the character of the rock selected?

The CHAIRMAN. I mean, geologically speaking, the character of the rock selected.

The WITNESS. Geologically speaking, it was a sort of bastard granite or gneiss.

Q. The same sort of bastard granite or gneiss that we see up towards the President's country house in cuts through the hills there along the roadside, and up the northwest branch of the Potomac, where the roads go?—A. Not the reddish appearance that the exposed rock generally has.

Q. The exposed rock is almost always decomposed, is it not?—A. Those all along the line of the roads you refer to are.

Q. Is not this bastard granite—which is a very good description of it, I think—exactly the same rock as that which we see on the exposures, except that it is not yet decomposed?—A. No, sir; it seemed to be a different quality of rock down there, some of which on exposure very shortly commenced to disintegrate and crumble, but other parts of it did not show the same signs of decomposition.

Q. Is not that which does not decompose somewhat blue in color?—A. No; I don't recollect that.

Q. Now we will go on in regard to the people who were employed there. I believe that you have said that Captain Symons and Lieutenant Townsend were the only assistants employed from the Engineer Corps?—A. Yes, sir.

Q. Did you have any assistant civil engineers?—A. Yes, sir. There were two or three or four civil engineers who had been engaged from the commencement of the work in original surveys and examinations, but they were not there any considerable length of time, and none of them had much to do with the work; that is, so far as the tunnel work was concerned; they did not seem to have much knowledge of that affair;

and eventually they were reduced in number to one man, Mr. Coryell, who was engaged shortly after the Government work on the tunnel began.

Q. Who engaged Mr. Coryell?—A. I think Captain Symons engaged him after a conference and inquiry or investigation, to find somebody to take the work.

Q. Were you consulted in regard to Coryell?—A. Yes, sir.

Q. Did you make any inquiries concerning him?—A. I did not, myself.

Q. Had you heard of him before?—A. No, sir.

Q. Do you know where he came from?—A. He came there recommended, as I recollect, from Baltimore, as having been engaged on the Baltimore tunnel extension. He was recommended by the chief engineer or one of the chief engineers under whom he had served as qualified for the work.

Q. Are those recommendations on file?—A. I do not know whether they are or not; I have not made any examination to see.

Q. Do you recollect any other references or recommendations about him than what you have mentioned, from the engineer in Baltimore?—A. No, sir.

Q. Did anybody ever speak to you about his employment?—A. I have not the least recollection of anybody speaking or writing about him.

Q. Did you see Coryell before he began to work?—A. I have no recollection of it, and I do not believe I did.

Q. You did not put him through any examination or conversation to test him yourself, so far as inquiries, etc., were concerned?—A. No, I am very sure I did not; I have no recollection of it.

Q. What were the duties, then, that Mr. Coryell was employed to perform?—A. The special functions required of him in the beginning were the instrumental work in the tunnel, in laying it out, and, under Captain Symons, to act as immediate assistant in the tunnel when Captain Symons could not be there, to represent Captain Symons in his absence on other parts of the work.

Q. Were those duties stated in writing by any letter of instructions?—A. No, sir, I think not. I think he was simply instructed verbally to report to Captain Symons for orders, from day to day.

Q. Mr. Coryell's duties, I understand you, consisted of instrumental work, in regard to keeping the line all right?—A. Yes, sir; the lines and the grade.

Q. Aside from that, he was also a deputy of Captain Symons in the positive control and superintendence of the work, to see that it was done according to the contract, and done well?—A. Yes, sir; it was his function to represent Captain Symons in the captain's absence, and to take action in the event he found anything going wrong, just exactly as Captain Symons himself would have done if he had been present.

Q. Was it expected at the time of his selection that Captain Symons would thereby diminish his attendance?—A. By no means; it was simply to have some one present who could be in immediate authority in the event of Captain Symons's absence in attending to some of his other work, which extended to different parts of increasing the water supply.

Q. Captain Symons was not in any sense relieved from any superintending responsibilities, such as you have described before?—A. No; I couldn't say that he was relieved from any superintending responsibilities.

Q. But when he was absent he would necessarily have to trust Coryell?—A. Certainly.

Q. And Coryell was selected to take that trust?—A. Yes, sir.

Q. Why did not you, considering the great importance of that work, make more specific inquiries as to the character of Mr. Coryell, considering the fact that there must be times, as you have described the method of putting in this lining, etc., when Captain Symons could not or would not be there, and the whole responsiblity of defective work would be upon Coryell's shoulders?—A. I instructed Captain Symons when he reported to me—I think it was Mr. Merrill who was there before him, but we did not think he had had experience enough to be equal to that work—to look around and see if he could find a man who would fill the bill. I did not undertake to do that for him; I had not the time; and as the immediate responsibility for the work necessarily devolved upon him, I preferred that he should select some one in whom he had confidence. So he took the opportunity to go around and confer with engineers who had had experience, and their subordinates, in order to see if he could not by that means find some efficient and immediate aid on the work, and he made that selection. I thought that he could give it much more time and attention than I could myself, and I started out with the intention that he should select his own immediate assistants. I followed that as a principle, almost invariably.

Q. Where is Coryell now?—A. I think he is in the city.

Q. Does he reside here?—A. I am not sure.

Q. Is he still in the employ of the Government?—A. He is not.

Q. When did he leave that employment?—A. I think it was in the early part of this year; I should say in January or February, 1888.

Q. During the time of Coryell did you receive any report or information as to any defective work in the lining of the tunnel or otherwise?—A. No, sir; none whatever.

Q. Then down to the beginning of 1888 you had had no report and no information, good, bad, or indifferent, reliable or unreliable, that anything was going wrong or being a failure in the execution of the work?—A. I had no report to me, or intimation made in any way or shape, that defective work was being done by the contractors in the tunnel in relation to the lining. The first intimation of that kind coming to me was during the past summer.

Q. I will go back a little now to this report of the Board of Engineers in August, 1886, when you say there then existed 1,200 feet, in round numbers, of lining, and ask you how it came about that this Board was appointed?—A. It was in pursuance of the requirement of an act of Congress making the appropriation for that year.

Q. That I know, but how did Congress come to interfere? Something must have happened, I take it.—A. In my annual report or in a special communication through the War Department I brought before Congress the fact that the money appropriated was not sufficient for completing the work under the original bill, and I submitted an estimate for completing the work, etc. That brought a letter to the Committee on Appropriations from Captain Hoxie, stating that he had seen a copy of this letter, and that in his opinion the increased expense would be unnecessary if the work were carried out on this plan—something to that effect, that is, criticising the management of the work, and stating that it could be done for much less. That developed an investigation.

Q. Now, right there, is that letter of Captain Hoxie in print?—A. I am not sure about that; it is not in print, as far as I know, unless it is part of that same report to which I referred before—the report on the deficiency appropriation bill made in 1886.

Q. To whom was it addressed—to the committee or some member of it?—A. It was addressed to the chairman of the Committee on Appropriations of the House.

Q. What was the difference between what you were doing, which he criticised, and Captain Hoxie's original plan?—A. The two elements of criticism, as I recollect them now, were, first, that we should have sunk our shafts deeper, and thereby insured coming to solid rock, whereby no lining would be required, or at least the amount would be very much diminished; and second, instead of using brick for the purpose of lining to any considerable extent, that for the entire arch, side wall and invert, the lining should be of concrete, the whole of it.

Q. That led, as you suppose, to Congress making this provision that the Board of Engineers should consider?—A. Yes. After making a prolonged investigation themselves, in making the appropriation the proviso was incorporated that the Board should determine the question of lining, both considering the expense and the question of safety.

Q. That Board convened about August, 1886, you say?—Yes, sir.

Q. Who were the members of it?—A. It was the permanent Board of Engineers on Fortifications and River and Harbor Improvements, I think, whose headquarters are in New York.

Q. Is there any report in print?—A. Yes, sir; it is published in the annual reports. That Board has been changed; I forgot no v who composed it.

Q. State as well as you can what it recommended?—A. They indorsed the use of brick arch in lining, as was then being practiced, but recommended the substitution of rubble masonry laid in cement as the backing or packing behind the brick, in lieu of dry-stone packing that had been used before, as an element of additional security; or, that, as a substitute for the rubble packing, it might be made of fine concrete packed around larger stones—a combination of heavy stone with concrete packed in between.

Q. Do you know whether that Board made any actual inspection or investigation of the tunnel itself at that time and of the 1,200 feet of lining then, or not?—A. Yes, sir; they went in the tunnel.

Q. It necessarily follows, from what you have already said, that down to that time and after that time nothing appeared to this Board of Engineers, or to you, or anybody else, so far as you know, representing the Government, that there was anything yet wrong about it except the possibility of the dry packing not being so safe as the kind they recommended?—A. That is my recollection of it.

Q. You may now tell us who selected the Government inspectors of the work?—A. They were generally selected on the recommendation of Captain Symons in the beginning, or Lieutenant Townsend afterwards.

Q. Who actually appointed them, you or the chief engineer?—A. I presume I did. They had no letters of appointment. It was generally done by the captain saying "I have got another man here who I think will fill the bill; we need another inspector on the work; shall I try him." That is about the way most of these men were picked up. We generally had to hunt out a man to get some one.

Q. Were any of these inspectors, from beginning to end, ever recommended to you personally or otherwise than by Captain Symons or Lieutenant Townsend?—A. Yes, sir; there were two cases I can recall. It was not a matter of any frequent occurence that came up, but I have in mind two now who have been inspectors on the work and who were recommended to me either directly or indirectly in addition to being recommended through others.

Q. Who are those inspectors?—A. One is Mr. Kirlin, the present supervising inspector, who has been on the work some years; he was recommended to me through Colonel Craighill, on whose work he had been engaged up on the Kanawha, I think; I know he had been in the Government service for some time, and he was recommended to me directly by Colonel Craighill.

Q. By anybody else?—A. I cannot say now whether or not that came to me as a recommendation, or in response to a question to Colonel Craighill as to this man; I do not know whether he brought a recommendation, or whether I asked Colonel Craighill about him.

Q. If he brought one, have you it?—A. If he brought one to me it is undoubtedly in the files of the office, because all recommendations, such as I have had, are on file.

The CHAIRMAN. I wish you would bring up all the recommendations from anybody for inspector or civil engineer.

Q. Who was the other inspector?—A. Mr. Masters.

Q. Who recommended him?—A. Mr. McComas, a member of Congress from Frederick, Md.

Q. About what time was that?—A. About the time that the work was being resumed this year, and, I think, during the progress of the work before; I think the first time he recommended him to me was some time previous to this year.

Q. Did anybody else recommend Masters?—A. Not that I remember.

Q. Now, coming back to Kirlin, he being recommended to you by Colonel Craighill, did you see Kirlin when he came on?—A. Yes, sir; his first service was not as inspector; he was employed as foreman on the laying of the 48-inch main on New Jersey avenue.

Q. The iron main; was that for what Colonel Craighill recommended him?—A. He recommended him as a good man to take charge of a main or as inspector over contract work; substantially that.

Q. He did not recommend him, then, with special reference to this tunnel?—A. Oh, no, sir.

Q. How was it in regard to Masters; was he recommended by Mr. McComas with special reference to this tunnel?—A. That is my recollection, that he was recommended with reference to the tunnel; I do not know that it was with special reference.

Q. When was Kirlin transferred from contract work here in the city to the tunnel?—A. I think it was in the summer of 1886 that he went on the tunnel. In the meantime he went from the 48-inch main, after it was completed, and was assigned to duty upon the dam at Great Falls, and was there during a portion of that work.

Q. But he got to the tunnel in 1886?—A. In 1886; I am not certain just what day, but he finally went to work on the tunnel.

Q. Then he was designated as supervising inspector?—A. As supervising inspector for work on the tunnel.

Q. And at that time only this 1,200 feet existed that you have spoken of?—A. Yes; that is all.

Q. So that Kirlin has been supervising inspector of the lining work of the tunnel from the time work was resumed after the Board of Engineers had made their report down to now?—A. Yes, sir; I think his appointment was made very shortly after the resumption of operations, as nearly as I can recollect now, and that he has practically been the supervising inspector of lining since the work of dry-stone packing in connection with the lining ceased. I think I can say that substantially.

Q. Was Kirlin brought up a stone or brick mason?—A. He had had a great deal of experience in stone and brick masonry work, as reported to me.

Q. What was his experience?—A. I do not know whether he was a brick or stone mason actually himself, but I do know that he had been engaged on masonry construction for some years.

Q. Was it you who transferred Kirlin to the tunnel or employed him there?—A. Yes; I think I did.

Q. Did you investigate Kirlin's capacity as to his knowledge of good cement and bad cement—the composition of it?—A. I investigated it by actual tests under myself. He satisfied me as to his ability as a superintendent, and also as inspector of the work.

Q. Some of the work he had been doing on this large main was masonry work, was it?—A. Yes, sir. There were a couple of masonry vaults that were built under his immediate direction; the work on the dam was entirely masonry construction; and he came from masonry work on the Kanawha.

Q. So that he was a proper person and entirely competent to do what was required for the safety of the Government?—A. So far as I knew, he was among those who would be the first to be selected by me. So far as I knew, I had no one accessible to me in whom I had so much confidence for that work. I believed him to be the most competent man, from what I had seen and heard of him, for that purpose.

Q. I suppose there was only one supervising inspector?—A. He was the only one so designated; yes. Since that time he has had what you might call two deputy supervising inspectors who supervise, under his immediate direction, several other inspectors.

Q. We will follow those two down. Who were those two deputies or assistant supervisors he had?—A. There was a Mr. Briggs, who had supervision of that part of the work extending from the Rock Creek shaft, the lining connected with that part of the work, going westward; and Mr. Lucas connected with him in the Champlain avenue shaft, supervising the inspectors who were in that part of the tunnel.

Q. East of Rock Creek?—A. Yes, sir; the work connected with Rock Creek shaft.

Q. So that Briggs was a deputy supervising inspector west of Rock Creek, and Lucas east of it, under Kirlin?—A. Yes, sir; Kirlin had the general supervision of them all; his functions were throughout all parts of the tunnel. It was his function to look generally after those sections.

Q. How did Briggs get into the service?—A. I think he was appointed upon Lieutenant Townsend's recommendation.

Q. Do you know where he came from?—A. No, sir.

Q. Do you know any other person who recommended him beside Lieutenant Townsend?—A. No, I do not. These appointments were made in a general way and under the same general conditions I have indicated.

Q. Particularly Lucas; who first spoke to you about appointing him?—A. Captain Symons, I think. He was appointed early in the work; that is, he commenced service quite early in the work.

Q. Did anybody else than Symons recommend him to you?—A. No, sir; not that I recollect at all.

Q. Do you know where Lucas came from?—A. From Washington, I think.

Q. Did Captain Symons inform you anything about him or of his history or antecedents?—A. I don't recollect that he did; I don't know anything about his history.

Q. You took him simply upon Captain Symons's recommendation, and trusted to that?—A. I appointed him just as the others.

Q. How were the subinspectors under these supervisors selected?—A. They were selected in substantially the same way, so far as I know.

Q. Were there any of them, except the two whom you have already named, recommended to you by anybody except the officer in charge?—A. I do not recall any one whose recommendation did not come to me through the officer in charge; I do not recall any other but those two.

The CHAIRMAN. To-morrow, if you please, you may bring up the whole stock of your information on that subject.

Q. After commencing operations on the tunnel, subsequent to the report of the Board of Engineers in 1886, when did you first hear in any way or from any source anything in respect of any imperfection or alleged imperfection in regard to the lining of the tunnel, or the packing or backing connected with the lining?—A. I do not recollect a report being made to me of defective work in relation to the lining during that year until we had resumed work this spring.

Q. My question was not directed merely to a report.—A. Or knowledge.

Q. Wait a moment. You will observe that the question asked you was when you first heard from any source or anybody anything concerning any defect in the lining or backing or packing, or any alleged defect?—A. The first that I can recall of hearing in any way of such a defect in the lining was during the early part of the past summer, probably in July, though I can not locate the time, and that was in a report from Lieutenant Townsend to me, that he had found that there was some dry work, and had caused them to pull it out. That, to the best of my recollection, is the first that I heard of bad work in the tunnel.

Q. That, you think, was in July?—A. I think it was in July, it may possibly have been in June.

Q. Was that report of Lieutenant Townsend's in writing?—A. No, sir; it was verbal.

Q. A mere oral communication to you?—A. Yes, sir.

Q. Did he state who was engaged at that place where he found the bad work?—A. Yes, sir.

Q. Just state all about that, what he said and what you said.—A. He said, in connection with that, on looking at it, this dry packing seemed to extend a little further than he could see at the time, and he directed that a certain length of the wall should be torn out, with a view of seeing how far it extended. He caused that to be torn out, I think, a distance of about 40 feet, as I recall at the present time, and that resulted in the contractors being required to build it up again, and he supposed it was solidly put back, so far as he could tell. The people engaged on that work were discharged or left the work, that is, so far as they could fix any responsibility for it at the time.

Q. Have you told all that took place between you and Lieutenant Townsend when he made this 40-foot communication to you?—A. We discussed the matter as to who was the inspector on the work who had passed the work, and it was the understanding when we parted that this man would be discharged and that the workmen should also be sent off of the work; that is, that he should instruct the contractors to discharge these workmen who had been engaged in placing the dry-stone packing in the work, and that was the general understanding; whether I instructed him to do so, or he suggested that it should be done, I do not recollect.

Q. At the time he stated this to you the first time, did he say that he had then already caused 40 feet or any other part of it to be taken down?—A. I think so; I think he told me that he had left directions to have it torn out.

Q. That he had directed it to be done?—A. I think he told me that he had directed it to done.

Q. But you do not remember that it had actually, at the time of this first interview, been done?—A. No, sir; I can't say that.

Q. You do not know whether it had been done or not; you do not remember?—A. No, sir.

Q. Who did he tell you was the inspector?—A. Mr. Masters.

Q. Did he tell you who were the persons engaged in the particular work, aside from mere laborers?—A. No, sir.

Q. Did he say anything about any subcontractor at that time?—A. No, sir.

Q. I think you have already stated that you did not know of any.—A. I did not know of any at that time.

Q. So far as you knew, or believed at that time, Beckwith & Quackenbush were the people in actual contract responsibility, or in actual supervising working responsibility, in putting in the lining and backing?—A. Yes, sir; I believe that Quackenbush was in local charge here generally, and that the men who were in the tunnel were the agents of Beckwith & Quackenbush immediately and generally as foremen, etc.

Q. Did you, on receiving this information that 40 feet of the tunnel was found to be so defective as to require it to be torn out, immediately communicate that fact to Beckwith & Quackenbush, or either of them?—A. I think it was immediately after that that I directed Lieutenant Townsend to communicate in writing with Beckwith & Quackenbush as to the fact that he had found this dry packing, etc.; this defective work.

Q. You made no communication yourself as engineer in general charge?—A. No, sir; my communications were almost exclusively, except as to settlements under the contract, communicated to the superintending engineer.

Q. You think you directed Lieutenant Townsend to communicate with the contractors?—A. I think immediately after that work I did so, yes; I know at one time during this summer——

Q. Are you sure that that was the first time you remember having heard of anything wrong there?—A. I think that was the time, as nearly as I can locate it now.

Q. What was the communication that you directed Lieutenant Townsend to make to the contractors?—A. I told him to notify them in substance that defective work had been found in the tunnel, the packing being put in dry, and that if that continued the annulment of their contract would be recommended; that is the substance of it. It was a notification that if they persisted in doing defective work in the lining it would lead to a recommendation of the annulment of their contract. The letter also dealt, if I recollect correctly, with certain conditions relating to a lack of progress in certain parts of the tunnel, having reference to that requirement which called for the completion by a given date.

Q. You have reason to suppose that Lieutenant Townsend conveyed that instruction to them?—A. I know as a fact that he did communicate to them in writing.

Q. Immediately?—A. I should say so, within a day or two.

Q. Have you a copy of the communication in your office which was sent by Lieutenant Townsend to the contractors?—A. The copy is on the files of the office.

Q. What did Lieutenant Townsend get from Beckwith & Quackenbush in response to that communication?—A. There was a response stating substantially that if bad work had been done they were not aware of it; that it was against their most stringent orders, and to that effect; also referring further to the criticism as to their progress, and making certain explanations in relation to that. That is on file.

Q. I think you have already stated that they had, as they must have have had, a foreman in charge of actual construction and inspectors, have you not?—A. They had a foreman and they had superintendents; they had an engineer, I think, and certain foremen along the line.

Q. What became of Masters and his inspection?—A. He left the work, I think, before Lieutenant Townsend had an opportunity to communicate with him.

Q. He left immediately?—A. Yes, sir; I understand he left immediately. I know he went off the work and was not on it at that time. I understood at the time that he was discharged, but from what I have learned since then, I understand that he did not wait to be discharged, but that after the detection of that bad work he told one of the inspectors he thought he might as well go. I do not think he was actually discharged, though I did understand at the time that he was discharged.

Q. At that particular place was there no other inspector than Masters?—A. No, sir; I presume not. Masters was under the supervision of one of these other inspectors.

Q. How many hours a day did work go on at that place as you understand?—A. I think the work was ten hours a day; I think the working time was from 7 to 5.

Q. With one hour off at noon?—A. With some time off at noon, a half hour probably; I do not actually know what time they worked.

Q. So that if you had one single inspector at work at that place (saying nothing about the supervisors) he would be required to be on the spot and watching constantly for ten hours a day?—A. Ten hours a day, with the intermission at the nooning, whatever that was; I think that was the rule.

Q. His watchfulness, as you have before described the necessity of it, then, would be required constantly for the ten hours, with the exception of the lay-off at the nooning time, or whatever the time was when the men were lying off?—A. Yes, sir; that was the purpose of the sub-inspectors who were engaged.

Q. Do you think that was good administration, considering the nature of that work, to require so much of a single man?—A. I did think so; I did not think ten hours' work was too much to require of them.

Q. You thought that was good administration?—A. I thought so.

Q. Is that your opinion still?—A. It has not turned out to be an efficient rule. The question you want me to answer is whether I think that was an efficient administration?

Q. Yes, we want to get at your general idea about it.—A. I think that the force of inspectors employed on the work could have done what they were expected to do, as the work was finally organized. At each place where this was going on there was an inspector appointed whose business was to be on the scaffold where the work was going on and to give his undivided attention to that point. I think that, so far as the work was required, the hours were not excessive, and he could do his work as easily as a mason could stay there and could do his, and without any more exhaustion. There were only certain conditions that sometimes might have interfered with the working of an honest inspector, one who

was trying to do his duty fully, as I can see it now, and that was after blasts in the vicinity, when the tunnel and those cavities under the roof filled sometimes with smoke, there was such an atmosphere that you could hardly see in it. I think then an honest inspector could have been deceived, even if he was standing right at the scaffold.

Q. By the way, how was the tunnel lighted at the place where the work was going on?—A. By gas; they carried gas into almost all parts of it.

Q. This work this summer was not going on while they were blasting for the drift; it was holed through before that, was it not?—A. It was holed through, but they had to trim it in order to put in the lining that was continually coming; they had to make an enlargement of the tunnel for the lining.

Q. After this first event in June or July that you first heard, when was the next time that you heard from any source of anything wrong there?—A. Shortly after that, I can not say how long. Lieutenant Townsend also reported to me that he had discovered some more defective work in a section that was being inspected by Mr. O'Brien, and after he discovered that he said he had as much confidence in this man as he had in any one in the tunnel; that is, he believed that he was a good man; and he said that he had made such a plausible excuse as to his absence from the scaffold at the time that this small hole had been covered up, that he believed O'Brien would really take it as a good lesson, Lieutenant Townsend believing it to be his first offense and a piece of carelessness, and thinking that he would be a better inspector after that, after finding how easily he could be deceived by a little thing or by a short absence, and that it would be better than to put in a new man, and he said he believed in giving him another chance, as he was an active, vigorous fellow, and that he would recommend giving him another chance instead of dismissing him; that that was the conclusion that he arrived at at that time.

Q. Did you make any communication, or direct him to make any, to the contractors about that bad work?—A. No, sir; on one occasion he sent one written communication to the contractors on that subject during the summer.

Q. And that is the one that you have mentioned?—A. Yes, sir.

Q. You have stated that in the first instance the contractors were notified that if that thing continued the contract would be stopped. Now the next time you discovered it you did not stop the contract. By the way, state when this second communication from Lieutenant Townsend to you was sent, as nearly as you can.—A. I could not identify the time. I know it was after the occurrence on Masters's work there. I can not express the length of time.

Q. Nothing appears in your papers to show?—A. No, sir; it was a verbal conversation entirely.

Q. Why did you not communicate with the contractors or direct Lieutenant Townsend to do so?—A. This appeared to be a very small piece of neglect at that immediate point. The work when it was started to be torn out seemed to be sound; it seemed to be more a piece of deviltry on the part of the workmen than any neglect on the part of the contractors.

Q. Were the workmen discharged?—A. I am not sure about it.

Q. Did you give no directions in that respect?—A. I gave no directions about a discharge other than the general directions that where men were doing defective work they must be ordered off the tunnel; those were the directions generally understood, that where men should

be detected in doing bad work the contractors would be called upon to remove them from the tunnel. I know that there were quite a number of men removed who were detected in doing bad work.

Q. Can you not state about how long you think it was after the first occurrence in June or July when this second one occurred?—A. I should say that it was in the neighborhood of three weeks or a month afterwards, possibly.

Q. When was this third time that you heard from any source of anything wrong?—A. So far as I can recollect that was the last until I heard through the publications made through the press, in the latter part of September, charging defective work generally.

Q. You refer to the charges of the Kendalls?—A. Yes, sir; I did not see that matter in the papers at the time, because I was away from here. I received a letter from Lieutenant Townsend; I do not remember whether he inclosed a newspaper slip at the time, but he told me generally that defective work had been charged.

Q. At what time, if any, did you do anything in regard to extending this first contract?

The WITNESS. The first contract?

The CHAIRMAN. Yes.

The WITNESS. That is all shown by these letters.

Q. All shown by the letters and papers?—A. Yes, sir.

Q. Did you make any communication, to any committee or to Congress on the subject of their giving Beckwith & Quackenbush more time?

The WITNESS. During this last year, for an extension beyond the 1st of November?

The CHAIRMAN. During the year.

THE WITNESS. That is not the original contract.

Q. Never mind the original contract. Did you make any communication to Congress or to any committee of Congress concerning giving Beckwith & Quackenbush more time in which to do their work?—A. Yes, sir.

Q. What time was that?—A. I should say that was in the early part of this last September, say somewhere between the 5th and 15th of September; I gave Senator Allison, or left in his committee-room, a statement as to the impossibility of completing the work by the 1st of November, and suggesting that such legislation be had as would extend the time.

Q. When was that communication, with reference to your learning of the existence of bad work?—A. It was after that.

Q. Which was after?—A. The communication to Senator Allison stating that the work could not be completed by the 1st of November, and recommending that provision be made for carrying the work on. As to its being a recommendation for the extension of the contract of Beckwith & Quackenbush, it had no relation to that; it was simply a recommendation that such Congressional action be had as would relieve the doubt as to whether any money could be spent on the work after the 1st of November.

Q. When this first discovery was made of the 40 feet that you have already spoken of, how much lining remained to be done in the tunnel?—A. I should say about 8,000 feet; it may have been 9,000. It would depend so entirely upon the exact period.

The CHAIRMAN. When you go to your office please ascertain for us how much lining in longitudinal distance has been done since you learned of this first defect.

The WITNESS. In other words, running down to the discharge of Mr. Masters?

The CHAIRMAN. That would be shorter.

Q. Did you extend the contract with Beckwith & Quackenbush?—A. Yes, sir; the original contract has been renewed by supplementary articles on three occasions.

Q. Have you made any extension since you discovered either of these defects?—A. No, sir.

Q. Then I infer, from what you have said before, that at the time you made the last extension of the contract and modification of or supplementary to it you had no knowledge or suspicion that the thing was not going right in their charge?—A. No, sir; I thought they were doing good work.

Q. Did not these two occasions when you found defects arouse your suspicions as to the possibility, without any regard as to how it would happen, that in all these long distances there might be other places where the workmen had left holes?—A. It did arouse my suspicions and fears; that, in connection with the defective work that had been developed on the New York aqueduct tunnel, began to make me fearful that we might have something of the same kind, the result of which was that I went over to New York and had quite a long conference with the president or chairman of the board of aqueduct engineers in New York and with his chief engineer, Mr. Church, though I did not have any conference with him so directly as with General Duane, as to the methods adopted by them for determining and picking out bad work or repairing it. That was in the early part of September, probably a week before the developments by the affidavits of the Kendall Brothers here. I think I left here on the 12th or 11th of September, and it was in the week following that I saw General Duane.

Q. You had begun to take steps, then, to ascertain by the best means what the condition of the whole work was before you had heard of the Kendalls' story?—A. Yes, sir; there had been no breath of that at that time.

Q. And your steps in that regard, if I understand you, were taken in view of the fact that those two defects you have mentioned had been discovered here and what you had heard concerning the New York work?—A. Yes, sir; the fear that naturally would arise on such occasions took possession of me—that we might find some bad work—and I wanted to know and wanted to get the benefit of their experience.

Q. What did you do in carrying out that line of action?—A. Before I got back this other matter had been developed. I came back and commenced an investigation with the only means that we had at command, and that was by boring through the masonry in the tunnel at different points. But in the mean time I opened correspondence with General Duane, looking to obtaining from him, as one who had become an expert in the way of detecting defective work, the use of the methods which they had finally adopted, and that was the use of a sounding-rod; and we eventually got a man who is now engaged at that work.

Q. Before that, what did you actually cause to be done in the tunnel? A. I actually caused a party to be organized under the direction of Lieutenant Townsend to go down and drill through at intervals, either where it was suggested bad work would be found, or at random—to drill through and try by drilling to determine the probable character of the work. He continued operations of that kind through several days; I have forgotten now how long it was, though I suspect it will appear here as a report that I have submitted in regard to the matter.

He reported that undoubtedly in a number of places his drill had penetrated into void spaces over the key of the arch. On that I went to the tunnel with him, and for three or four or five days probably we were engaged day after day in tearing out the entire arch at parts where this defective work had been indicated by the drill. A great many places where the drill had passed through the brick lining indicated the belief that the packing was comparatively solid; that is, it did not show cavities or voids. Operations in the mean time on the lining of course were suspended.

Q. How many spaces did you bore?—A. I couldn't state the number; upwards of a hundred or more.

Q. Assuming it to be a hundred, what percentage of that hundred borings did you consider to show bad work?—A. In one part of the tunnel a very small percentage, say not more than 10 to 15 per cent. of the tunnel (that is the section west of Rock Creek, where the borings were made). In the easterly section, which was east of Chaplain avenue, where borings were made, there the percentage was much higher, probably 50 per cent., in some of the new work over the arch. That may be overstating it, but it was quite general. We came to the conclusion that there were quite a good many cavities above the key of the arch in that section of the tunnel, though the side walls from the borings showed good work so far as boring could show it.

Q. How in the haunches?—A. In the haunches the same, so far as the penetration of the drill showed.

Q. Only along the top the borings showed bad work?—A. Yes, sir; that was the condition; and wherever we opened up the brick arch generally the side walls and haunches showed substantially good work. I do not mean by that that every void between the stones was solidly filled with mortar, but it was substantially solidly packed, such as would afford a rigid resistance to the back of the brick arch.

Q. What would be the effect of a single undiscovered void, say 4 feet in diameter, 4 feet in height, after the water was let in?—A. Well, I think that a void of that space, an absolute hollow over a brick key, would be very apt, from the internal pressure, to burst the pipe at that point.

Q. That would render the tunnel just as useless for the time as twenty such places, would it not?—A. No, sir; I do not think it would, necessarily. I think that would open a way through it, and the water would get outside, and a few bricks might fall down in the bottom of the tunnel, but it would not render it useless.

Q. It would render it just as useless as if it was not lined in that vicinity, would it not?—A. Yes, sir.

Q. And if the water under that pressure were capable of passing along the outside of the lining and between it and the rock in either direction, it would at least fill the whole outside, would it not?—A. Yes, sir.

Q. And then the fact would be precisely the same as to the delivery of the water and as to its effect on the land above, and everything else, as if there were no lining at all, would it not?—A. Yes, sir.

Q. What provision did you calculate upon, supposing any accident should happen, the tunnel having been well built, on the theory that it was necessary to get down into the bottom of it for the purpose of reparation or cleaning? What provision did you calculate and estimate in regard to emptying the tunnel for such purposes?—A. In general the idea was that there would be a 48-inch blow-off in that part of Rock Creek in which it would be emptied. When we commenced working

this spring after the tunnel had been allowed to be filled up, it was pumped out after that. The idea was to erect in Rock Creek, where most of the pumping would be required to be accomplished, a permanent pump of considerable capacity, and using pumps available for pumping at other shafts when it might be necessary. It was simply a question of pumping out the tunnel.

Q. How much did you estimate would be the cost of that pumping?—A. I have made no detailed estimate of the cost of a permanent pumping.

Q. That was not included in the estimates you submitted to Congress?—A. No, sir.

Q. Why did you not put them in?—A. Because I looked upon the question of emptying the tunnel more as a question of operating expenses from year to year. The same principle would apply to that that applies to the existing aqueduct.

Q. What do you think the pumping work would cost planted at Rock Creek? State approximately. You are a skillful and practical man?—A. I can not speak as an expert in relation to permanent pumping work because I have had very little reason to inform myself on the subject of estimates of permanent pumping work in relation to water supply. But I should suppose that everything that was required for that purpose at that point, of adequate size and plant, could be easily put in for $20,000 to $25,000; I should think that would be all that would be required at Rock Creek for a permanent pumping work.

Q. What was your calculation or opinion in regard to the sediment that would accumulate in twelve months at the lowest place in the tunnel?—A. I do not think that there would be any considerable amount of sediment deposited there that could not be easily taken up by the blow-off.

Q. First, I am on the question of how much sediment would be deposited, as you think, by the ordinary use of the tunnel in twelve months, without regard to blowing it off, taking it year in and year out.—A. I can only guess at that, too, in the absence of any data, that it may be a couple of months, and might be five or six, down in the pocket, so to speak, at Rock Creek, for instance, using that as an example, it being the lowest or deepest pocket.

Q. How much sediment has deposited annually in the distributing reservoir at its eastern section, which, I suppose is the clearest? At least it should be.—A. That is the clearest. I can not tell how much has deposited annually because the casual soundings made through there did not show any perceptible increase; that is, as reported.

Q. Have you had any systematic observations made there from year to year since you have been in charge?—A. No, sir; I find no record of any. I have been making an investigation of the records to see if I could find any data in relation to that, and finding none, I directed the superintendent of the aqueduct last week to commence to take a series of soundings in order to determine the amount of sediment actually in the distributing reservoir now.

Q. Has the distributing reservoir been emptied since it was first put into use in 1859, or whatever year it was?—A. Not that I know of; I find no record of it.

Q. What was the nature of the bottom of the reservoir? Was it paved, or was it simply clay bottom?—A. I do not think there is any pavement on the bottom; I am not sure.

Q. Do you know whether it is laid down in concrete?—A. I do not think it is.

Q. You think it mere earth, then?—A. I think it is mere earth.

Q. It would not be perfectly easy, then, to go to the deepest part of it and ascertain with certainty how much sediment was deposited and how much dissolved clay?—A. It could only be by a comparison of the record as to what elevation the bottom of the reservoir had been with drawings on file in the office, which show the bottom at a given elevation.

Q. Have you at any time yourself tried to find out what there was in the lowest part of the eastern section?—A. Individually, no, sir.

Q. Have you ever had it done?—A. I have had it done through the superintendent and watchman there; they have made soundings.

Q. How recently?—A. Along during the past early summer.

Q. Was that by soundings or by putting down a pole?—A. It was by putting down a pole.

Q. But you did not scoop up the sediment to see how much loose matter there was?—A. No, sir.

Q. I notice in your printed tables and reports concerning water that you gave the number of days when the water is at different degrees of turbidness, and one head is "very turbid," I think is the phrase, and that I suppose represents the worst condition as to clearness?—A. Yes, sir.

Q. Do you not think that during this period of time there must necessarily have been a good deal of sediment deposited?—A. Well, during a maximum period there would be a considerable deposit, of course; but I do not think it makes a very considerable deposit, taking it all through, from one year's end to the other. I do not think in inches it amounts to any considerable deposit.

Q. Please state the condition of the work on the new reservoir and any failure that has happened about that, if there has been any.—A. I know of no failure about that. All the work that has been under contract has been completed. What is needed to complete the reservoir to such a condition as to enable its use is the construction of the gate-house and the completion of that portion of the reservoir about the gate-house, and that can not be done until the tunnel operations at Howard University shaft cease, because it is located immediately over the outlet of that shaft.

Q. Were the contracts in regard to the reservoir fulfilled?—A. Yes, sir, excepting in relation to the time; the times were extended.

Q. But the very thing that the contractors engaged to do was done?—A. The work was done. The work of excavation, embankment, the paving, the conduit construction, and all improvements of that kind were done, so far as the work itself was concerned.

Q. Satisfactorily?—A. Yes, sir, so far as the result is concerned, as to the quality of the work to be done; it was not satisfactory during its progress as to delays and slow workmanship, and matters of that kind; it was not satisfactory at all.

Q. But as a means of holding water you think it is satisfactory?—A. Yes, sir; I have confidence that it will be satisfactory.

Q. What method have you adopted to prevent the external water from the valleys above the new reservoir getting into it?—A. There are two streams coming in from the valleys of the Soldiers' Home grounds, one on the northeast and one on the northwest extremity of the reservoir. Each is intercepted by a brick and stone conduit, essentially a sewer of large size, and that is carried around exterior to the sides of the work, and the two streams join below the southern extremity of the reservoir and come back into the general stream to

which these two branches were tributary at the time of leaving the Soldiers' Home. Those side conduits at the same time have inlets, intercepting streams of drainage, that are tributary to the sides of the reservoir. The surface drainage is taken in through gutters overland, similar to the way in which surface drainage water is taken into the sewer.

Q. How is this conduit sewer, as we may call it, constructed? Is it built of stone?—A. It is built on a foundation of concrete, which constitutes the bed on which the trap-rock bottom is laid for a short distance; above that it is brick-work, backed with concrete and filled in with earth.

Q. How high is the flowing bottom of this sewer above what will be the bottom of the reservoir?—A. In some parts it is below and in other parts it would be a little above, I take it.

Q. Take the northern side, for instance, the uphill side, and take a level there from the bottom of your conduit to the bottom of the general surface of the reservoir; what would be the difference in level, and which would be the higher?—A. I think at the upper extremity the bottom of the sewer is a little below the bottom of the reservoir, and as you pass down the bottom of the sewer gets above the bottom of the reservoir.

Q. The reservoir is lower at the south end, then?—A. It is lower at the south end than at the other end.

Q. The bottom of the sewer would be a good deal below the ordinary surface of the water when the reservoir is in use?—A. Yes, it would be below the surface.

Q. About how many feet should you say?—A. It would vary from one point to the other.

Q. Yes, but take the point of the difference.—A. I can not answer the question. I can give you the figures exactly and show you the drawings and profile; that is complete exactly as constructed.

Q. As constructed I infer the danger of intermixture of water there of the sewer and reservoir would arise from the reservoir water coming into the sewer, rather than the sewer water getting into the reservoir by percolation, leakage, or otherwise?—A. The pressure, as compared with the head of the water on the outside, would always be from the reservoir into the sewer.

Q. So that, so far as regards water from the sewer getting into the water in the reservoir, it would be physically inpossible?—A. Yes, sir.

Q. Because the head in the reservoir is altogether above the line of the sewer, if I understand you?—A. Yes, sir.

Q. You made no calculation, I suppose, in reference to the possibility of bad water from some distance higher, say at the Soldiers' Home building, which would be above the surface, descending through crevices in the rock or grounds, and coming up into the reservoir?—A. No, sir; I did not anticipate the probability of the water supply being impaired by exterior causes like that.

Q. Is the lining of this reservoir supposed to be actually tight, so that it will not leak under pressure when it is full?—A. It is supposed to be sufficiently tight for that purpose; that is, the ground is of that character that it is believed to be sufficiently water-tight.

Q. It was ordinary earth that was taken out?—A. What might be called clay, porous earth, and filling was put in to replace it.

Q. What is the thickness of the filling?—A. It varies from 1 to 3 feet at different places.

Q. And then on top of that what is laid?—A. A thickness of possibly a foot or 14 inches of broken stone.

Q. Just laid loosely?—A. Stone just thrown together, forming a bed.

Q. What you might call microscopic riprap.—A. Small riprap; and on top of that is a layer of about 8 inches in thickness of stone pavement laid dry.

Q. All over?—A. All around the sides for a distance of 15 feet below the flow line.

Q. Then below that are these loose stones?—A. Under that; that is, the paving stones rest on that broken-stone backing; below the stone pavement there is no stone protection.

Q. Simply the earth?—A. Simply the earth.

Q. So that when the water is let in the basin that holds it, when you get below this stone paving it goes down 15 feet out of your 40, or whatever that is; simply the natural earth?—A. Yes, sir; it is an earthen slope.

Q. An earthen basin at the bottom too, is it not?—A. Yes, sir.

Q. Do you think that will stay hard and not soak up?—A. I think there will be a certain amount of absorption into the soil in the process of filling the reservoir.

Q. Suppose it was required to clean that of leaves that blow in, and of grasses that usually grow in water, how would you do it with that kind of bottom?—A. I presume that kind of bottom could be dredged, if necessary.

Q. Would you expect to clean it by dredging?—A. That is one way in which it could be done.

Q. Is there any outlet to draw the water out of that reservoir into the valley below?—A. Yes, sir; there is an outlet-pipe, that was only designed to drain the lower portions of the reservoir. The provision made for draining the reservoir was in connection with the outlet up near the aqueduct, to carry into the western side conduit; that is, it was in contemplation to put in a drainage-pipe there, which would drain the upper levels of the reservoir. Then there is a smaller pipe that passes into the valley of the creek, by which the lowest portions of the reservoir can be drained to the same limit that it is drained now; indeed, it has been the draining-pipe for the accumulation of storm water during the progress of construction.

Q. Does that drain it all off?—A. It drains it all off to the extent you find it drained now.

Q. I mean does it take it out to the bottom?—A. Oh yes; it leaves substantially a dry bottom.

Q. About how high up from the bottom of the reservoir is the inlet to be from the tunnel?—A. The inlet from the gate-house was projected, I think, 12 or 13 feet above the lowest part of the bottom of the reservoir; that is my recollection of the distance finally settled upon.

Q. So if the entrance gates were closed and the blow-off at Rock Creek were set in motion, it would drain the water back out of the reservoir, so that there would be only left from 12 to 14 feet of depth in the reservoir; is that what you mean?—A. That was hardly what I meant by that. It would leave that depth at the deepest part of the reservoir. I put that distance about 12 feet, assuming that the whole depth below the reservoir would be about 30 feet; as a matter of fact it will not be as deep as that in all portions. Where the water was deepest originally, 30 feet, there the water would be about that depth, 14 feet, if I recollect correctly the measurements taken at the beginning of the construction of the tunnel.

Q. Your drawings and profiles show exactly how much water would run back, I suppose?—A. That question of the construction of the

gate-house is only in the study stage; it has never been approved or adopted.

Q. Then it would be competent for you to let the water in at substantially the bottom of the reservoir if you wanted to?—A. Unquestionably.

TESTIMONY OF CURTIS McD. TOWNSEND.

MONDAY, *November* 26, 1888.

CURTIS MCDONALD TOWNSEND, sworn and examined.

By the CHAIRMAN:

Q. What is your rank in the Army?—A. First lieutenant, Engineer Corps.

Q. What is your age?—A. Thirty-one.

Q. When did you first become connected with the Washington Aqueduct tunnel work?—A. I reported for duty to Major Lydecker on the 4th of May, 1887.

Q. What were the duties to which you were assigned?—A. He assigned me to duty as supervising engineer of the aqueduct extension.

Q. That is, from the present distributing reservoir to the new one?—A. From the present distributing reservoir to and including the new one.

Q. Who was your immediate predecessor in the actual charge of the work?—A. I had no immediate predecessor. Captain Symons had been in charge of the work until 1886. There had been civil engineers in charge of portions of the work; Mr. Coryell was in charge of the tunnel, and Mr. Partridge was in charge of the reservoir. When I reported I was to supervise both portions of the work.

Q. What was the nature of the duties which devolved upon you in that connection?—A. I inspected the work, saw how it was being conducted, examined the estimates, and performed generally the ordinary duties of supervision of work of that kind.

Q. What was actually going on when you took charge?—A. The tunnel had been excavated in what we termed a normal section, with the exception of the portion between Champlain avenue and Howard University. They were lining in Howard University shaft; were also lining in Champlain avenue east drift; and in Rock Creek shaft they were lining, I think, in the west drift; and there was a force that worked in Foundry branch shaft. On the reservoir at that time they were excavating and had nearly completed the dam; they were excavating up in the northern part of the reservoir.

Q. How many distinct gangs of workmen engaged in lining were there when you took charge?—A. There were four; that is, they were lining at four distinct points.

Q. About how many men were employed at each one of those points?—A. Say, generally from two to three brick masons, about two or three packers, and the necessary laborers; say, half a dozen laborers would be supplying material.

Q. Under whose inspection was that work going on at those four places at the time when you first came there?—A. When I first arrived there Mr. Coryell was generally inspecting the work; then he had two assistants, Mr. Kirlin, who was inspecting the work generally from Champlain avenue to the west shaft, and Mr. Tarbell, who inspected

the work in Howard University shaft—that is, confining myself to the lining. Of course, there were also gangs engaged in excavating and lining which I have not mentioned. Under them there were, as sub-inspectors, Mr. Harper, in Howard University shaft; Mr. Lucas, in Champlain avenue shaft; Mr. Boyce and Mr. Masters, in Rock Creek shaft; and Mr. Lannigan, who was in the Foundry branch shaft.

Q. All those persons you found there?—A. Yes, sir.

Q. Did you make any inspection yourself at that time or immediately thereafter of the lining that had already been completed?—A. I made a general inspection of the force at that time. I was directed by Major Lydecker when I came here to examine into the force and to report to him what I thought of the character of the men. I passed through the work, spent about two weeks in making examination in regard to what I judged of the men's qualifications, and then reported to him.

Q. Did you report in writing?—A. No; verbally.

Q. Tell us what was the substance of what you reported to him, if you please.—A. I reported to him that in my judgment the inspectors were efficient men, and I thought they were doing their duty faithfully and honestly, but I doubted the efficiency of Mr. Coryell.

Q. Did Mr. Coryell continue on the work?—A. Yes, sir.

Q. What did he do after you came?—A. After I came his duties did not remain the same as they were before; he had general charge of the work; took cross-sections of the tunnel; attended to the lining; after a little while his duties were practically confined to the lining; that is, all orders which were given I gave to him, but I saw myself that the inspectors received those orders.

Q. Do I understand you to mean then that after a little while he had no responsibility as regards the nature of the work actually done in respect of the lining?—A. He was not relieved from that responsibility, but I myself saw that all orders and directions were given directly to the inspectors myself.

Q. About how much of brick lining, taking it altogether, had been put in when you arrived and took charge?—A. I should say from 7,000 to 8,000 feet, but I would not be positive as to the exact distance.

Q. Did you examine the nature of the work that had already been done?—A. No more than to examine it as I would see it in passing through. I would examine the mortar and brick-work, and I saw all that I could see.

Q. Had you any reason to suspect at that time, in any way or from any source, that it was possible that the lining had not been suitably constructed as regards the backing?—A. No, sir.

Q. How was the backing put in when your attention was first called to the work actually going on at those four places?—A. The cavities had rubble masonry lining; the stone was placed in with mortar, filling all spaces between, or should have filled all of them.

Q. Did you at any time observe the men at work?—A. Yes, sir.

Q. How large were any of the spaces at the sides or at the top of any of the linings that they were then filling in with packing? How wide and how high, for instance?—A. Over the key of the arch they extended from 4 inches to 5 feet.

Q. Varying as the different surfaces of the rock, as it was blasted out, would be?—A. Yes, sir; very irregular. The rock of course would break in all directions, and some of those spaces would be very close to the arch, and then again there would be a large cavity.

Q. What was the precise duty of these inspectors who were in charge at those four places?—A. The inspectors' duties consisted in first seeing

that the proper lining was placed in the tunnel; that the lining masonry work was properly done; they also had to take cross-sections at that time as a check upon Mr. Coryell's cross sections at each heading; they would in front of the masonry, as it was going on, take a series of cross-sections.

Q. What was the purpose of that?—A. The contractors had complained that Mr. Coryell had not been taking cross-sections properly, and they claimed that they were larger than he stated, and this was ordered by Major Lydecker before I came there as a means of checking, in the interest of the Government and contractors, to determine definitely as to the truthfulness of the cross-sections.

Q. The contractors being paid by the cubic yard?—A. They were paid by the cubic yard at that time, yes.

Q. And the point of the cross-sections from step to step then was to ascertain precisely how much work they should be paid for?—A. It was to determine the amount of masonry they were to be paid for, not the amount of excavation; after the excavation they were to be paid for masonry filling in accordance with that contract.

Q. That is what I refer to. The inspector then was to see to it that the lining itself, the brick and the filling or packing above and behind and around it, was complete according to the contract?—A. Yes, sir.

Q. And the contract required that all the vacant spaces outside of the lining should be filled?—A. That they should be filled with rubble masonry or with stone solidly laid in cement mortar.

Q. So that there should be no open space?—A. So that there should be no open spaces.

Q. What was the natural section, or whatever you would call it, that they built up their trestle-work or wooden arch to build around?—A. Their centers were 14 feet long.

Q. And the top of the lining at the key above the floor of the tunnel would be about how high?—A. I have forgotten whether it is 9 feet 11 inches or 9 feet 10 inches; I think it is 9 feet 10 inches; there is a cross-section giving it exactly in one of these books.

Q. In round numbers about 10 feet?—A. That is my impression.

Q. Does that include the thickness of the key?—A. No, sir.

Q. Or is that in the clear?—A. That is in the clear.

Q. So that a key of three rings would be 14 to 15 inches more?—A. Thirteen inches more for three rings.

Q. What would a man have to do in order to be sure that the contract was fulfilled in respect to this filling outside of the lining?

The WITNESS. You mean an inspector?

The CHAIRMAN. Yes.

The WITNESS. He could see that it was filled with solid rubble masonry.

Q. How constantly would he have to watch to be sure that it was done?—A. The inspector should see that every few minutes to insure it. He could leave the work for a short time and return, but a man might perhaps do a small piece of bad work without him seeing it if he left that portion of the work; he should return so as to discover it in a very short time.

Q. How could he discover it?—A. For instance, if the inspector goes from place to place attending to the brick work and the rubble masonry, and the man attempted to put in any large quantities of bad work, if the inspector was attending to his duties he could return in time so that he could head him off before he would have laid more than a layer of dry stone.

Q. Some of these vacant spaces outside of that lining, as I understand you to say, would be quite small?—A. Yes, sir.

Q. Not an orifice large enough for a man to get into to work?—A. No, sir.

Q. And in that case it would be necessary that the packing or filling, whichever you call it, outside of that lining should keep very closely up to the laying of the brick arch, would it?—A. Yes, sir; there were two varieties of work that we did—on the sides of the arch and the haunches of the arch and on the key of the arch—and the methods of work in those two cases were different. Along the side of the arch the brick would be brought up to a certain distance, and the brick-masons would then proceed to their sides and lay the brick there; and then the men who were doing the packing would fill in the space on that side and as soon as the work was finished on that side they would alternate from side to side. In doing that tunnel work the brick-masons would lay off a given distance, depending upon the size of the hole above the key, and then they would stop work and the packers would fill in that space. In these narrow spaces they could lay about two feet of brick, and then fill in the packing. In a wide space they could lay four feet, not in a very large space, but could lay the whole arch and then pack.

Q. In these smaller spaces, then—my inquiry was—it would have been necessary, in order to have the work complete, that the packing should keep close up to the laying of the brick?—A. Yes, sir.

Q. And if it did not, necessarily—no matter how well a man meant to do—he could not fill it in far back?—A. No, sir; he could not fill it in but a short distance.

Q. But in the case of these smaller spaces it would take much less time, for a workman who did not mean to have it filled in behind, to project his brick work and then fill in the space, than it would to have a larger space, would it?—A. Yes, sir, it would.

Q. When did you first hear in any way of any suggestion that any of that lining or this filling was not done fully up to contract requirements?—A. In August, 1888, was the first information I had, or the first intimation I had, from any one.

Q. Can you fix about what time in August?—A. It was the first or second week in August; it was at the time of the discharge of Lucas, one of the inspectors; that is the date.

Q. Was it before or after his discharge?—A. It was after he had been suspended; between the time of his suspension and discharge.

Q. What was he suspended for?—A. I had grave suspicions in regard to the man's efficiency, and it being necessary to drop one man, as there was one less gang to be employed, I recommended that he be suspended in preference to any other brick-layer.

Q. You say you had suspicions in regard to his efficiency?—A. Yes, sir.

Q. When was the first time that you had any such suspicions?—A. When I first came upon the work I was not impressed with the man, but I always found him an efficient workman. However, at this particlar time I heard a rumor from irresponsible persons that Mr. Lucas wanted to be bribed; that was the rumor. I did not know what it meant; I could not trace it; it came through workmen, and I simply just recommended that he be suspended.

Q. How long was this that you heard through workmen before the time that he was suspended?—A. It was probably two or three days before.

Q. What point was he then superintending?—A. Champlain avenue in the east heading.

Q. Who was the foreman, under the contractors, of that gang?—A. McNamara was foreman under the contractors in the heading, and I have always considered one of the masons as foreman on the scaffold.

Q. Just tell us exactly what you mean by a heading.—A. At the sinking of a shaft the tunnel is driven in two directions; we call each of those directions a heading; the tunnel proper is a heading from that shaft.

Q. And what was the foreman at the heading attending to?—A. His duties consisted in seeing that material was properly brought to the work, and I suppose generally to supervise the work done in that heading, including the laying of brick. There was a general foreman of contractors by the name of Brennan who had supervision of the work from Rock Creek shaft to Howard University shaft.

Q. Which covered this point where Lucas was?—A. Yes, sir.

Q. Down to this time, early in August, you had heard nothing and suspected nothing as to any impropriety?—A. No, sir.

Q. Had you seen anybody around the work there who appeared to be the superior of this general foreman; had you seen any contractor?—A. There was Palmer and Brennan, who appeared to be employed as foremen, and then there was the other contractor, Mr. Beckwith; I never saw Mr. Quackenbush.

Q. Did you have any reason to believe at that time that Palmer and Brennan were subcontractors in any respect?—A. Yes and no. I will have to explain that. I had the idea that there was some form of agreement between them, but I did not consider it a subcontract; at least I paid very little attention to it. I had been informed that those men were receiving $5 a day as foremen. I also knew that the workmen were being employed by Beckwith & Quackenbush, and I always addressed Beckwith & Quackenbush; but I had heard that there was some form of subcontract between them.

Q. How often was Quackenbush there?—A. I never saw him in the tunnel; I have seen him at the shaft a number of times.

Q. What did he appear to be doing?—A. Examining into the work and talking with the employés.

Q. Doing what a contractor would naturally be doing, I suppose you mean?—A. Yes, sir.

Q. Then was there anything in this relation, something in the nature of a subcontract which you suspected to exist, which changed the conduct and control of the work, so far as you could see?—A. No, sir; I found the foreman of the contractors inspecting the brick and seeming to supervise the entire work.

Q. Having suspended Lucas in the way you have stated and for the reason you have stated, what next occurred in regard to this matter of imperfections?—A. Mr. Lucas came to me and charged O'Brien with having left a hole; O'Brien was an inspector; Lucas charged O'Brien with not having properly inspected a piece of work in Rock Creek; it had been reported to me by Mr. Kirlin that bad work had been done. I investigated the matter and came to the conclusion that while Mr. O'Brien had been negligent, yet that he could have reasonably misunderstood Mr. Kirlin's orders, and I merely censured him but did not discharge him. When Mr. Lucas made this charge I paid very little attention to it; I thought he was jealous of the man who was succeeding him.

Q. I think you must have misunderstood a former question of mine when I asked you the first time you had heard or known in any way of

any imperfections in the work, and you stated it was the time that Lucas was suspended.—A. After I had been on the work a few weeks I saw small pieces of work which I ordered torn down, but nothing of any very great extent until this year.

Q. I wish you would tell us after you came on the work when it was that you first heard in any way or knew of the discovery of any bad work in connection with this lining?—A. That was when I had been inspecting the work in the vicinity of a month. I found a piece of bad work, a piece of work which had not a sufficient amount of masonry. I had that torn out.

Q. Where was that?—A. It was under Mr. Boyce, as inspector in Rock Creek; that was a small place.

Q. What was that imperfection?—A. There was not enough cement, and it was near the top of the tunnel. There was generally cement on the stone, but I found that over back of the stones there was very little cement, and I ordered the stones taken out and properly repacked.

Q. Did you see them taken out yourself?—A. I saw two or three of them taken out; I saw the stones taken out until it appeared to be perfectly solid.

Q. All the bad work that you could discover there you saw taken out until you saw what appeared to the eye to be good work?—A. Solid work, yes, sir.

Q. Right there, was any explanation given to you by the foreman or anybody, then and there on the spot, how that thing happened?—A. No, sir: I never asked about it; I assumed that it was a mere piece of carelessness. It was not of very much importance one way or the other.

Q. How large a spot was that?—A. A place 2 feet by 1.

Q. And how high?—It was just a layer of stone, not over 6 inches.

By Mr. RYAN:

Q. Were the men who did this bad work continued?—A. Yes, sir; in my judgment it was a case of carelessness when they were trying to put in rubble masonry and did not get it close to the wall of the tunnel and had not put in enough mortar.

By the CHAIRMAN:

Q. Who was then in charge as Government inspector?—A. Mr. Boyce.

Q. What did you say to Boyce about it, or he to you?—A. I called his attention to the fact, and told him that I did not want to see such a thing occur again. I paid very little attention to that piece of work, as I did not consider it an indication of bad work. I considered the work would have been pretty solid if it had been left in.

Q. Was Boyce there when you had it taken out?—A. I think at the time I had it taken out he was a short distance away; he was in the tunnel, but I do not think he was directing the work.

Q. Did you call his attention to it then and there?—A. It is my impression that I did.

Q. What, if anything, did he say?—A. I don't remember that he said anything.

Q. When was the next time that you heard or discovered any work which you thought was not good?—A. There was another piece similar to that discovered last year, I do not remember when; I could not locate that.

Q. That is, it went on from what date?—A. May, 1888.

Q. It went on from that time until when?—A. Until September, and

I found very little that I criticised in the work; it generally appeared to be good work.

Q. During that period?—A. Yes, sir.

Q. What was that period between May and September?—A. There may have been one or two cases of bad work similar to the one I have described.

Q. Can you remember them?—A. I could not locate them; no, sir. I have an impression that I saw some little thing that I called the attention of the inspector to, but I would not be definite.

Q. There was nothing that made so much impression on your mind as this instance you have already related?—A. No, sir; not so much as that. The first piece of bad work I found this year was in laying the foundations of side-walls.

Q. And this you have just been speaking of was in 1887?—A. Yes, in 1887. There was very little in that year that I found that I could criticise in the work.

Q. Have you stated everything that occurred in the year, that you can remember now, in regard to bad work?—A. Yes, sir.

Q. Did you make any written report to Major Lydecker on the subject of any one of those occurrences?—A. No, sir; I did not look upon them as serious pieces of work; I looked upon them as pieces of carelessness, where men were generally doing good work.

Q. Did you not understand that one bad spot in a tunnel that was to stand a pressure of that character might be fatal?—A. Yes, sir; but I did not look upon these as being what you would term really bad spots; there was considerable mortar used, but I merely thought there was not enough. It was not dry stone work, but they had not used a sufficient amount of mortar to insure that every spot would be full; in other words, that they were trying to do good work and it was a piece of carelessness rather than any deliberate attempt to put in bad work.

Q. The thing then went on satisfactorily to you until what time this year?—A. Up till the close of the work last year; and upon the commencement of work this year I found several pieces of bad work.

Q. What time did you commence work this year?—A. I commenced in May, 1888.

Q. Your work having been suspended how long?—A. The masonry was suspended from the beginning of October until May. There was other work being done in the way of mucking the tunnel, perhaps two months.

Q. During the winter?—A. From September into December they were employing a small force clearing out.

Q. But from December, 1887, to May, 1888, nothing was being done, practically?—A. No, sir; the tunnel was filled with water.

Q. Work stopped the 1st of December, 1887?—A. Yes, sir.

Q. You were still in charge?—A. Yes, sir.

Q. Can you tell us how long it took the tunnel to fill with water at the lowest point, which I suppose was Rock Creek?—A. It took about a month.

Q. How long did it take to pump it out?—A. It took about a month to pump it out, with one extra pump more than the contractors now have.

Q. How many pumps were in operation pumping it out during that month?—A. There were five, not employed all the time, though. For instance, at Foundry Branch shaft the bottom of the shaft is considerably higher than that of the other shafts; that was pumped out in two weeks, I think. At Rock Creek shaft there were usually two pumps,

and while they were pumping at Rock Creek they were also pumping at the other shafts, and there were two pumps at Rock Creek until that was reduced below the summit; that is, at each heading there was an inclination, and until the water went below that summit in Rock Creek two pumps were employed in that heading, I don't remember exactly how great a distance down below, and then this extra pump was taken to Champlain Avenue shaft, and two pumps employed there until that was pumped clear of water, and then they were taken to Howard University, and that was pumped free of water. There was a different amount of water to be taken from each shaft, but the total amount of time consumed in pumping was about a month.

Q. The five pumps going more or less?—A. More or less, as much as they could be used.

Q. Do you know how much water they pumped out?—A. I never computed it.

Q. Have you the means of computing it?—A. Yes, sir; I have the dimensions of the pump, the stroke, and I also have a record of the number of days that they were working.

Q. Did the engineer in charge of the pump keep any record of the rapidity with which they worked?—A. He was required to keep a given pressure in his boilers of 60 pounds; I do not believe that it was always kept, but it was in that vicinity; I think it is fair to say that it was over 50 pounds.

Q. But if he had 60 pounds in his boiler and did not open his throttle, it would not make any difference with the pumping, would it?—A. No, sir; if it was not used. Mr. Kirlin was still employed as inspector upon the work, and he inspected the pumping.

Q. The theory is, then, that they worked up to their capacity?—A. That they worked to their capacity? I do not know that they did.

The CHAIRMAN. I wish you would make and give us, at your early convenience, a rough computation of about now many million gallons of water were taken out of there.

Q. If I understand you, then, we have substantially satisfactory work until last spring, in May; then you say you discovered something. Now tell us, in detail, step by step and time by time, in chronological order, as far as you can, what erroneous or wrong things you discovered and what you did about it.—A. The first work that I found was some dry packing in the masonry side-walls under Masters, inspector, in Foundry Branch east heading; that was in June. I called Mr. Masters there. He was at the time on the arch at a distance of probably 20 feet from where this took place, and I cautioned him in regard to the work, and notified him that this could not be tolerated, and cautioned the chief inspector, Mr. Kirlin, in regard to the matter. I also had it torn out and replaced.

Q. How large a place was that?—A. That was a place of 6 or 8 feet long and probably 6 or 8 inches wide, and extending down 2 or 3 feet.

Q. What was the defect there?—A. Dry packing.

Q. Just stone laid in loosely?—A. Laid in fairly carefully, but there was no mortar. In fact there had been no mortar used except some that had been scattered from the top.

Q. Did that look as if it had been accidentally scattered, or intentionally?—A. Intentionally. From this I became satisfied that Masters was not an efficient inspector, and I told him at the time that if anything of the kind occurred again he should be discharged. Mr. Kirlin reported to me in a few days from that time that he had discov-

ered another piece of bad work. In fact he stopped the work at the time and came to my office, and I went with him to inspect it.

Q. You made this remark to Masters on the spot?—A. On the spot.

Q. What did he say?—A. He said he had tried to do the best he could, but he had not seen it. I informed him that he must see such things; that that was what he was there for.

Q. What excuse did he make for not seeing it?—A. Just merely that he had not seen it.

Q. Who was in charge of the workmen?—A. A man by the name of Terrell; I am not sure, though, that he was there at this time; I won't be certain; he was there a few days afterwards in charge of the men.

Q. Was there some person there who appeared to be in charge at that time?—A. It is my impression that Terrell was in charge then.

Q. Did you see anything of Palmer or Brennan at the time?—A. Not at that time.

Q. Did you communicate with Beckwith & Quackenbush what you had observed?—A. Not at that time.

Q. Why did you not?—A. I did not think of it. I do not know that I spoke to any of their men at that time.

Q. I understood you to state that you thought, from the appearance of that spot, that it was an intentional circumstance?—A. Yes, sir.

Q. And thinking so, can you not tell us some reason why your suspicions were not aroused, and why you did not immediately call the inspector's attention to it?—A. My suspicions were aroused, and on the second offense I ordered the discharge of Terrell, the foreman of the workmen employed, and of Masters, the inspector.

Q. To whom did you communicate that order of discharge on the second offense—Beckwith & Quackenbush?—A. I communicated it to their foreman at the time. Brennan was present, and I communicated it to him directly.

Q. Brennan was then acting as general foreman?—A. General foreman.

Q. That was when the second offense occurred that you had begun to speak of?—A. Yes, sir.

Q. Did you report this first event to Major Lydecker, the one that you thought was intentional?—A. It is my impression that I did.

Q. But not in writing?—A. But not in writing; no, sir.

Q. Did you make any entries of it in your note-book?—A. No, sir; I did not. I have a written communication here, covering a number of those cases which, by direction, a short time after that, was written by the chief inspector.

Q. Addressed to you?—A. Addressed to me.

Q. By Kirlin, you mean?—A. Yes, sir.

Q. You may now come to the second event, after the tunnel had been cleared?—A. Mr. Kirlin notified me that he had discovered another piece of bad work.

Q. Fix the date of that as nearly as you can?—A. I should say near the 1st of July; I couldn't give the exact date. I then examined the work. I found a case of dry packing, of the same kind, and directed at that time the foreman in charge of the work, the packer, and the inspector.

Q. Who was the inspector?—A. Masters.

Q. Was that in the same heading as the former one?—A. That was in the same heading.

Q. How far had the work gone, lineally, from the place where you dis-

covered it the first time, where you saw this intentional defect, as you think, until this second event occurred?—A. Not over 40 feet.

Q. You say it was about the 1st of June that Kirlin communicated it to you?—A. It was near the 1st of July I should say.

Q. That was not at the tunnel?—A. No, sir; he came to the office to report to me by my direction.

Q. What direction did you give him?—A. I went out with him and examined the work.

Q. Tell us what you found?—A. I found a space of dry packing on the side of the arch, and I found some dry packing in the key of the arch, and I ordered the dry packing pulled out and removed, and the work properly replaced.

Q. What lineal extent of dry packing did you have pulled out?—A. I think there was over 30 feet of it that was pulled out.

Q. How did you accomplish that?—A. I had the workmen or the contractors tear out this work, and had Kirlin and Mr. Briggs stay there until they should find solid work.

Q. They tore out what?—A. They took out the rubble masonry and filling.

Q. This was all in the sides?—A. It was in the sides and over the key too.

Q. How could they get 30 feet over the key?—A. No, it did not extend 30 feet over the key.

Q. Did you have taken down any of the lining or brick work?—A. Yes, sir; some.

Q. How much?—A. I do not remember.

Q. What was the size of the cavity that they opened up by taking out this dry packing?

The WITNESS. Over the key?

The CHAIRMAN. Yes; or on any side.

The WITNESS. The length on the side would have been about 30 feet.

Q. What thickness?—A. And the thickness extended, I should say, from 3 feet to 6 inches; this would be purely stating from memory.

Q. How could a man get through 6 inches in order to cut this out?—A. There were two lengths of centers, and another center being keyed, and it was extending along the side, requiring but very little tearing of masonry in the length of the key to cut this out; it could be taken out from the top of the brick-work.

Q. But I mean where it was all arched over.—A. There had to be some of the brick-work torn out to remove it.

Q. How could you ascertain that you had got back to sound work in a space of 6 inches, where the brick arch was completed?—A. You could not. They tore out back of the arch until they could get in.

Q. You did not see that done?—A. I did not see that done; no, sir; it took them some time to remove it, and I left the chief inspector there to examine and see that it was all torn out that was bad work.

Q. What was the height of the space over the key after this dry packing was out?—A. I don't know; it is my impression that it would be about 3 feet, may be less, but I can not remember definitely.

Q. How could a man ascertain how far bad work extended if the orifice above was not large enough for a man to go in and pass out?—A. It could not be determined in any such case as that, but there was some brick-work taken out of the key; in the sides I don't think there was any.

Q. It would not be possible, then, for Mr. Kirlin to know whether he had got at the whole of the bad work there or not without taking down the key of the arch, would it?—A. He could tell when he came to solid work; in excavating into it if he got to solid work there he stopped.

Q. If you yourself had been watching and superintending the taking out of that bad work, would you or not have had your suspicions sufficiently aroused to go some distance into the solid work to see what was behind that?—A. Yes, sir.

Q. Do you know whether Mr. Kirlin did that or not?—A. He went into the solid work; he reported to me that he examined into the next bay.

Q. Did he make any report in writing at that time?—A. He made a report on our daily reports at that time.

Q. That was in writing?—A. Yes, sir.

Q. Where are these daily reports to which you refer?—A. They are in the office.

The CHAIRMAN. I wish you would bring those paper reports up here to-morrow, all of them, covering this period of time.

Q. Having directed the dismissal of Masters, the foreman and packer, if I understand you, did you make any communication to Beckwith & Quackenbush?—A. Not until about a week afterwards, except to their foreman at this time.

Q. Why did you omit to give information of an event of that kind, which, apparently, from your description, was quite a serious thing? Why did you omit to immediately communicate that to the contractors?—A. I directly communicated with the man that represented them.

Q. That was Brennan?—A. That was Brennan.

Q. What did he say?—A. He said that he knew nothing about the matter himself; that there should be nothing of that kind occur again if he could possibly prevent it.

Q. And that is all he said, in substance?—A. Yes, that is the substance.

Q. Did you report this event to Major Lydecker?—A. Yes, sir.

Q. What directions did he give you, if any?—A. None that I remember in regard to that.

MAJ. G. J. LYDECKER—Recalled.

TUESDAY, *November* 27, 1888.

Maj. G. J. LYDECKER, recalled and further examined:

The CHAIRMAN. I wish you would please read to us the memorandum which you made on yesterday in regard to the items of information which we requested you to furnish us this morning.

The WITNESS (reading from his memorandum):

The dressing of the profile of the tunnel as originally designed.
A reference to the Congressional document in which General Meigs refers to extension of the aqueduct by tunnel.
Telegrams in relation to the Deweese bid.
Monthly reports on tunnel for 1884.
All recommendations on file concerning appointment of inspectors, civil engineers subinspectors, etc.
The number of feet of lining done on tunnel since Masters's discharge.
The amount of sediment in distributing reservoir.
A statement of expenditures, classified.

All that I have been able to present so far is this book of reports.

Q. The book which you now present is your office record book of monthly reports?—A. Monthly reports of operations on work connected with the aqueduct.

Q. I wish you would look at your report of 1885, page 2471 in this printed document, in reference to your communicating a report to Captain Hoxie, and just read that which is in small print.

A. (Reading:)

Rock Creek may be crossed either by a gang of large cast-iron mains laid as siphons through the bed of the creek, or by a tunnel through the compact rock which underlies this stream. If borings of this rock are satisfactory the latter method is, I believe, the best and cheapest. The lining is so located that the conduit rests throughout on the natural ground when not in tunnel, and is protected, when covered by embankments, by side walls computed to resist independently the entire water pressure.

Q. What was the date of that report?—A. That was the report of Captain Hoxie, assistant to the Engineer Commissioner of the District of Columbia, and is dated October 10, 1879.

Q. Was Captain Hoxie at that time only an assistant to the Engineer Commissioner?—A. Yes, sir.

Q. He was not having any relation to this matter under the Chief of Engineers?—A. None whatever.

Q. What do you understand, from that paragraph you have read, was the nature of the work to which it referred, taking the whole distance from the western reservoir to the new one?—A. My understanding of that project, as thus presented, was that it contemplated an aqueduct of hydraulic grade between the two points, excepting at the crossing of Rock Creek, where there would be a conduit of some kind under pressure; that is, it being a descent down to the valley of the creek, either by a tunnel or by iron pipe; in other words, that the intent, when that was presented, was an aqueduct on grade similar to the original aqueduct, except in that portion which crossed Rock Creek.

Q. When you came into charge of this work, which was in August, 1882, I think, was Captain Symons under you?—A. Captain Symons was assigned to me subsequently, on my application.

Q. I see in the papers sent us from the office of the Chief of Engineers, copies of correspondence between the aqueduct office and Beckwith & Quackenbush, contractors, concerning the going on of this tunnel business, which correspondence began on the 18th of March, 1884.—A. Yes, sir.

Q. I see remonstrances from Captain Symons as to the impropriety of timbering in Champlain avenue, and in regard to the extremely slow progress of the work on the east shaft.

The next letter is dated May 15, 1884, calling their attention to the very slow and unsatisfactory progress made in the headings from Rock Creek and Foundry Branch, and stating that it is less than half that prescribed in the contract; also the necessity of pushing it in order that the work shall be completed in time; stating also that it will take more than another year at the rate they are going on. To which, on the 15th of May, 1884, the contractors replied, giving this excuse and that, in regard to leaks in their air pipes, etc.

That is followed on the 9th of June, 1884, by another letter of Captain Symons to them, again calling their attention to the extreme slowness with which the work was carried on at the shaft at the new reservoir, and stating that only 2 feet had been made during the month; that for a number of days nothing had been added to the depth of the shaft; that they can not excuse themselves on the ground that a pump

works badly; that they ought to have duplicate pumps; that such accidents, etc., are entirely inexcusable.

There appears to have been no reply to any of these except the one to which I have referred.

On the 20th of September, 1884, Captain Symons again addresses them stating that on the 12th of August a letter was written to them, with diagrams of tunnel cross-sections where masonry lining was required. That letter does not appear to be in this set of copies as it ought to be.—A. That probably, then, was a letter that contained no discussion as to a fault or failure on their part, but simply indicated certain instructions to them—a letter of transmittal; that is probably the reason it does not appear.

Q. He then says:

The height required for this masonry lining above the bottom grade of the tunnel is 12 feet in the one case, and 11 feet 3 inches in the other. In the west heading from Champlain avenue you (the contractors) have put the timbers through the soft ground at a height of 9½ feet from the bottom of the tunnel to the bottom of the cross-timbers. It will be impossible to get in the masonry lining required below these timbers in any way that I can see.

I call your attention to this, as it seems advisable to put in timbering of such dimensions that the masonry lining can be put in without disturbing it. Otherwise, it seems to me that it will be necessary to take down the timbering and replace it with that of proper dimensions in order to get the proper lining in.

I would also call your attention to the lack of care in some of the headings in keeping lines and grades. The west Rock Creek heading is very considerably below grade, and must be raised.

Apparently there was no answer to this.

On the 25th of September, 1884, he again addresses them, and states that the inspectors repcrt a very inadequate air pressure at the drills, delaying the work very materially; that it is also reported that in the Foundry Branch drifts the ventilator boxes are very distant from the headings and should be extended, and requiring them to attend to these matters.

Nothing else appears between them until the 29th of December, 1884, when he again addresses them in substance as follows: Calling their attention to the fact that the specifications of the contract call for a tunnel 7½ feet high and 11 feet wide. I suppose that means completed?—A. That was the normal section, which was where no lining was intended.

Q. The final working section for use, I suppose it means, does it not? That would be the section that carries the water, would it not?—A. Yes; substantially; but that was the normal cross-section, meaning substantially 7½ feet high and 11 feet wide, on the idea that no lining would be used in that section.

Q. What would be the size of a similar cross-section, as respects its use, where there was a lining all around? How wide would that be, and how high?—A. You could make several different forms.

Q. I know, but what was your plan?—A. I will have to refer to that drawing in order to give that in detail.

Q. Give it in round numbers. About how high, take it where it is now, all bricks, brick invert, brick sides, brick top, just as it is in substance? Tell us how high and how wide it is on the sides.—A. My recollection of the matter as to the sides is substantially that it is 9 feet high and 9 feet wide.

Q. He also states that in a great many instances this cross-section is exceeded, and the tendency seems of late to be towards making the tunnel considerably larger than is called for by the specifications. He also states that this is in rock which is of such a nature that by exercising

proper care a tunnel of any desired size could be driven in it. Then he says:

The enlarged section in the great majority of cases is believed by this office to be due entirely to the excessive charges of powder used in these holes, located so as to break the heading larger.

Then he says:

There is no objection on the part of this office to your enlarging the tunnel within small limits in good rock, if you see fit to do so at your own expense. But it must be distinctly understood that in all ordinary cases no payment will be made for rock excavated beyond the prescribed limits, and no claim will be favorably considered by this office for the same, or for its removal from the tunnel, either for the tunnel already driven or for that which may be driven in the future.

Then follows a statement from the contractors, addressed to Major Lydecker, under date of January 5, 1885, which appears to be, from these papers, the next communication that took place either way on the subject, and in which the contractors refer to points of difference in regard to the progress of the work and payment, the substance of which is that they have been required to do the instrumental work at their own expense, and they contend that the specifications do not require that, but that the Government ought to do all the instrumental work. That is of no consequence to our present inquiry. They contend, secondly, that the rock exterior to the prescribed area of the tunnel is to be removed and paid for at the expense of the United States, and quote a clause in the contract or specifications, which they say justifies that construction, and contend that they ought to have $4 per cubic yard for that outside rock of different character, and that they have only been allowed for a part of that kind of work at the rate of $1.50 per cubic yard, being the part of that work which the engineer office thought was really outside of the contract and was one of those extraordinary contingencies that the contract provided for, I suppose. They then state, in regard to the east connecting shaft, that the contract required an excavation of 19 feet square down to the solid rock, and then the shaft to be 14 feet in diameter, but when they got down there and undertook to make a shaft 14 feet in diameter, and make a collar, etc., the rock broke so badly that it was decided to go to the bottom of the tunnel to start the brick lining; and they say that they are entitled to payment for the expenditure for labor, etc., in cutting the collar over 14 feet surface, and for excavation of material to outside dimensions of shaft, as now constructed. They then say that certain portions of the tunnel require lining, and that some sections here and there have been ordered to be lined, leaving spaces which in some instances will require lining, they think, and that this work will be expensive and dangerous because the tunnel will have to be enlarged, and the adjoining work protected from blasting, and they want to begin in a certain way to go on with that, and to have it decided how much is to be left without lining, so that they shall not be obliged to go over the same ground twice.

Now you will notice that in all that they make no response, so far, to the repeated remonstrances and directions of your office in regard to going on with the work faster, and in regard to keeping within the limits of the prescribed areas, etc., not a single word.

Q. Then, on the 7th of January, 1885, Captain Symons addresses a letter to you upon the subject.—A. That I take it is a report in relation to the facts stated in the contractors' letter, is it not?

Q. Yes, it is headed that way. It is a report on that. In that letter

of January 7, 1885, nothing appears to be said in regard to the matters before complained of by Captain Symons at all, but it is only a discussion of the points raised in their communication regarding the extra work, pay, etc.

Then follows, on the 10th of January, a letter from Captain Symons to Beckwith & Quackenbush, in which he again calls their attention to the continued and highly unsatisfactory rate of progress of the work, stating that they have never yet in any one month attained a progress as great as the minimum rate called for by the contract; that the pressure gauges on the air pipes show that the average pressure at the drills is only about 42 pounds, while the contract requires not less than 60; that the contract requires that air shall be taken from the shafts to the headings in iron pipes of not less than 4 inches in diameter; that in several of the drifts 2-inch iron pipes have been used, in direct violation of the terms of the contract; and directs them to remove from the tunnel the 2-inch pipe used for conveying the compressed air, and substitute therefor the 4-inch pipe required by the contract. He also states that there are several other points in which, in his opinion, a much more rapid rate of progress could be made if attended to; one of them stated is a lack of proper and sufficient superintendence over the workmen; that a great deal of time is lost by a lack of proper supply of tools, square parts, etc., in regard to keeping the drilling machines in order; then he states various other ways in which they are deficient, in not providing themselves with the means, easily reached, of going on a great deal faster than they do.

To which apparently no reply was made.

Then on the 15th of January he again addresses them, stating that in the east drift of Rock Creek and Foundry Branch the excavations of the tunnel from the point established have been very badly carried, in fact that the line has been disregarded entirely, and he tells them that they are required to go back to the point where the departure takes place, and excavate as required.

Of course it would follow, would it not, that if they did that, then the excavation would be that much enlarged?—A. Yes, sir.

Q. And you would have a vastly unnecessary cavern there?—A. Yes, sir.

Q. Can you tell why your engineers and subordinates did not know when they first began to depart from the proper line and stop it?—A. Because it could only be ascertained by putting an instrument down there, and it was probably ascertained by that instrumental work at the end of the month. They had been given the lines and directed to keep to those lines.

Q. But you had one or two assistant engineer officers there and at least one civilian engineer?—A. Yes, sir; one engineer using an instrument and from time to time verifying the lines of grade as kept.

Q. Did they not verify more than once a month?—A. I am sure I do not know how many times they verified.

Q. What would be the proper duty of two engineers positively supposed to be on the spot seeing that the work was done according to the contract, in regard to finding where they were going with such a tunnel?—A. It would be their duty to do as much as they could humanly do to see that the work was carried on properly.

Q. Suppose they could not humanly do as much as possible to keep that straight, would it or not be their duty to report to you if they could not do it?—A. Certainly.

Q. If they had not the human power to do it should they not report

to you that they could not and call for more assistance?—A. If they felt that they could not, but I think they were instructed.

Q. Somehow or other it would appear from this correspondence that the line of this tunnel was in serious respects departed from, requiring a recutting, and thus greatly enlarging the orifice and greatly increasing the risk and the expense of backing the final lining, would it not?—A. It would, provided the Government had it to pay.

Q. It would increase it to somebody, would it not?—A. Oh, yes; it would make a bigger hole, which would have to be filled up, provided it was lined, undoubtedly.

Q. If it were not lined, in such a place it would still be worse, would it not?—A. Not if the rock required no lining.

By Mr. McMILLIN:

Q. There was a divergence here of 6 feet, and if they come back and straighten that 6 feet it would make an element of danger if it were not filled?—A. Yes, sir; if it required lining or was not filled in, of course.

By the CHAIRMAN:

Q. This tunnel being new cut throughout so that you know the character of the whole excavation, how much of the whole length of it, according to your present opinion, does not require any lining at all?—A. It was my opinion that to insure safety against the rock falling from the roof of the tunnel into the tunnel it would be better to line the entire extent; that is, to leave no part of the tunnel unlined, in order to avoid the possible fall of rock from the roof, whereby the tunnel might be obstructed; and for that reason, and for that reason alone, substantially about 8,000 feet, I think it is, of the tunnel is being lined with the arch and side-walls to sustain the arch. That would lead to the answer that about 8,000 feet of the tunnel requires lining, only for that reason, in my opinion.

Q. But I understand you to mean that that 8,000 feet does require lining in order to make it a sure success?—A. To insure it, yes. There is no part of the tunnel that does not require lining.

Q. For one reason or another?—A. For one reason or another.

Q. In that case, then, any orifice in the rock beyond the space absolutely necessary for building the lining and leaving a sufficient interior is an injury?—A. Yes, sir.

By Mr. McMILLIN:

Q. As a matter of fact, were the contractors paid for filling at this point where there was a departure from a straight line?—A. No, sir; as a matter of fact, as I recollect it, that line was not rectified. There is a bend in the tunnel; that is my recollection.

Q. What is the extent of that bend?—A. It is a very small one; it is a very gentle bend; I can not give exactly the dimensions; it is shown on the profile.

Q. And every bend in the tunnel would to some extent retard the water flow?—A. Not perceptibly.

Q. It would retard it, though, would it not?—A crooked tunnel will not flow water as rapidly as a straight one.—A. I am satisfied that with the rate of flow of water-supply through that tunnel it would be impossible to measure the decreased rate of flow due to any bend.

Q. I was not asking whether it would seriously impair the water supply, but would it retard the water flow? Is that your observation as an engineer?—A. It would not, measurably. Theoretically, every

bend, however small it may be, and every excrescence on the surface interfere with the flow of the water, but measurably there is nothing there that would interfere with the flow.

By the CHAIRMAN:

Q. After the communication we are now considering (January 15, 1885), Captain Symons next proceeds to state that the center line in the east drift, Foundry Branch, is cut off for nearly 100 feet, being 2 and 3 feet north of the north side of the tunnel excavation, and refers to a sketch inclosed, but that in a distance of about 25 feet from the point established by Mr. Coryell the north side of the excavated tunnel strikes the center line, and at a distance of 50 feet the center line is between 7 and 8 feet out of line. "This can not be overlooked, but must be remedied at your expense." Explain what that means.

The WITNESS. What part of it?

The CHAIRMAN. "The center line in the east drift Foundry Branch is cut off for a distance of nearly 100 feet, being 2 and 3 feet north of the north side of the tunnel excavation."

The WITNESS. That at a distance of 25 feet the north side of the tunnel would come on about what should be the center, and continue in that change of direction at the distance of 50 feet until it would be about 3½ feet on the other side; in other words, it comes almost to where the south line should have been.

Q. It is almost entirely across itself?—A. Almost entirely across itself.

By Mr. MCMILLIN:

Q. That would be, if I calculate correctly, a divergence of about 1 foot in 7?—A. About 1 foot in 7 at that point.

By the CHAIRMAN:

Q. I suppose the remark you have already made as to the duty of the Government engineers and overseers in charge in such cases would apply to this instance as well, would it not?—A. Yes, sir; I take it that is the very question to which he is referring. I think he is specifying the same thing.

Q. He then says that if it is found necessary to line the portion of the tunnel, "you will be required to fill in the enlarged excavation outside of the usual limits with dry-stone packing at your own expense." Down to the 15th of January, 1885, then, you were still on the dry packing?—A. Yes, sir; the dry-stone packing was continued through 1885.

Q. He then states that material from the drifts at Foundry Branch had been dumped into the creek and filled the creek to a considerable depth. "You will please have this removed, and avoid a reoccurrence." He then says that the reports of the inspectors show a progress during the first fifteen days of this month in the drift from the east shaft of only about 42 feet. That is less than 3 feet a day. He then states that—

> You have been fairly warned concerning this unsatisfactory progress in this drift, and must not be surprised if an annulment of your contract speedily follows, unless a much greater rate of progress is attained.

To which apparently there is no answer.

Then, on the 13th of February, Captain Symons again addresses them, saying, in brief:

> You have been repeatedly ordered to commence the work of lining in the tunnel driven from Champlain avenue and the reservoir shafts, and have not done so. I now emphatically repeat the order to you in this form, and must insist that the work of lining in the west Champlain avenue drift and the drift from the reservoir shaft be commenced without delay.

To which apparently there was no answer.

Then there is an interval from the 13th of February to the 6th of May before Captain Symons again feels moved to address them in writing. At the latter date he again says that he must again call their attention to this slow progress on that part of the tunnel where the greatest amount remains to be done; that—

> The progress in the east Champlain avenue shaft in April was 110 feet, and in the east reservoir shaft 118 feet, far less than in any of the other headings; the desirability of greater progress in these headings must be apparent to you, and any method by which this progress can be increased will result in material advantage to you as well as to the citizens of Washington.

Then he states that the then progress can be greatly increased by doing so and so.

The correspondence then jumps from the 6th of May to the 5th of September, 1885, where Captain Symons again addresses them, saying that in driving the tunnel where lining will be required the area is not kept down properly to the size required, and that the large and excessive area is due in a majority of cases to the careless and erroneous location of holes and overcharges of explosives; that in consequence a greatly increased cost for the dry-stone packing of the lining is thrown on the Government:

> You will please take the necessary steps to correct this condition of affairs. If the excess in the area of the excavation required for lining can not be kept down any other way it will be necessary to drive the tunnel to the normal section and enlarge it afterwards.

There appears to have been no reply to that.

The correspondence then takes a leap from the 5th of September to the 17th of December, when Captain Symons again addresses them, stating that he is informed that one of the causes of slow progress in the east heading from Champlain avenue shaft is the fact that the blacksmiths employed are not skillful in tempering the drills, and advises them that their interests, as well as those of the Government, require that the best and most skillful workmen be employed in this heading; and their attention is called to the matter and a change of blacksmiths is recommended. He also says that, from observations made in his recent trip to New York, he thinks greater progress can be made in this heading by using the larger sized drills with greater air pressure. He desires that they will consider the advisability of increasing the air pressure to 80 pounds at the drills.

The correspondence then leaps from the 17th of December, 1885, to the 1st of August, 1887, and Lieutenant Townsend is the writer of the letter of that date.

Before I go into that I would like to have you state to the committee whether you knew of the existence of this correspondence from Captain Symons to the contractors and of any correspondence in return that he or you received.—A. It would be impossible for me to say. I undoubtedly knew of the complaint that Captain Symons was making about the slow progress, because that was a matter of daily conversation between us; but as to the fact of his writing directly to the contractors, he might have written a number of those letters without me knowing anything about it.

Q. If you knew in general the substance of what I have stated to you in Captain Symons's letters, covering a period of a year and a half in round numbers, did you take any steps to annul the contract?—A. No, sir.

Q. Did you during that same time enter into anys upplementary contracts with these people?—A. No, sir.

Q. When were the supplementary contracts entered into? There are two or three, are there not?—A. I think there was one in the fall of 1886; I think that was the first supplementary contract.

Q. If you knew of it, and did not annul the contract, will you please tell the committee why, after such repeated and continuous disregard of the Contract, not only in respect of the time and the rate of progress, but in respect of the execution of the contract, you did not exercise the power, as reserved to you, or recommend the Chief Engineer or the Secretary of War to exercise their authority and put an end to transactions with these contractors?—A. Because I did not believe it to be to the interest of the United States to do so. I did not expect at any time to be able to get a perfect contractor on the work. If I had recommended the annulment of that contract for those reasons given there, I doubt whether I could consistently have avoided recommending the annulment of every contract in existence here in the District of Columbia at that time where there was continual cause of complaint on account of the lack of progress. Frequent defects are found which contractors must be called upon from time to time to correct.

Q. We are not much aquainted with such operations, and so I must request you for my own information, and for that of the other gentlemen of the committee, if they are not wiser than I about it, to tell us what sort of conduct in executing a contract for public work, and what sort of mis-execution or non-execution of a contract must exist, in your opinion, in order to render it to the public interest to get rid of that contractor. What could they have done or omitted to do, persistently and continuously, as this correspondence shows that they did do and omitted, which you think would have justified you in discharging them?—A. If, for instance, they had stopped work, had no force at all, and shown a deliberate determination to avoid doing what they were required to do, so far as pushing the work was concerned, that I should take it would be sufficient to cause me to recommend the annulment of the contract; if they showed no desire whatever to carry out their contract, that would be reason enough for that; if they repeatedly committed faults in execution, to which their attention was called day after day, I should consider that as showing that they did not make any reasonable effort to comply with their contract.

Q. Did they not repeatedly commit faults in their execution, according to that correspondence?—A. Not to any material extent, so far as I find. There were two or three places in which they got out of line or grade; they were also more or less careless at points and at times, but not habitually so.

Q. Will you not tell us why it was that they were not compelled to straighten that tunnel, as Captain Symons in one of the communications required, where they had gotten entirely out of line?—A. It was our judgment that it was not sufficiently important to straighten it; that we would get fully as good work by lining it as it was, so as to diminish the amount of packing and about equalize matters.

Q. The question of packing, as I understand you, would have to be at their expense, as Captain Symons says?—A. It would have been at their expense independently of what he said, because that part of the tunnel is the part that has been lined. I am not positive that that was taken in connection with the lining. The contract for this is one in which the payment is to be made for so much per running foot.

Q. That is under a new contract?—A. Yes, sir.

Q. But I am talking about the contract as it existed when they departed so radically from the line and were required by your assistant engineer, acting under your authority, to straighten that at their own expense, and were notified that the filling would have to be at their own expense. I want to know why that was not done, and your answer so far—which must be taken as sufficient if it is all—is, that it was thought to be better for the interest of the Government to leave it as it was.—A. When we came to deal with the question recently——

Q. No, then and there.—A. Then I can only say that I presume that Captain Symons did not see that the orders given to the contractors and superintending engineer were executed.

Q. Should he not have seen that they were executed?—A. I think he should. I think if I had given an order to a contractor to do a certain thing I should see that that order was obeyed.

Q. Did anybody say anything to you after the time when this enormous getting out of line or off the track took place? Did anybody say anything to you on that subject?—A. I have no recollection of the matter being mentioned at all from that time until the question of lining came up during the past year.

Q. Did you yourself give any orders about it?—A. No, sir; I did not.

Q. Did you ever have any discussion about it with Captain Symons, to your recollection?—A. I do not remember.

Q. Did you ever have any conversation about it with Mr. Quackenbush?—A. No, sir.

Q. With Mr. Beckwith?—A. No, sir, I think.

Q. Did you ever have any conversation about it with Brennan?—A. I don't know Mr. Brennan.

Q. With Palmer?—A. No, sir; I never have had any conversation, so far as I know, with any one excepting possibly at the time with Captain Symons. I knew of the existence of the fact that they had been detected getting out of line, because I remember that it was a matter which was discussed with Captain Symons. We discussed at the time the best means of keeping them in line, and also in regard to the grade, but from that time I have no recollection of any special discussion with him on that specific point.

Q. When you made the supplementary contracts with them, of which there are two or three, which was after all these transactions to which I have now called your attention, you knew in general of what had taken place in the course of the operations, did you not?—A. Yes, sir.

Q. Did you take any steps toward making new contracts with them, or did you require more strict performance?—A. No, sir; because the requirements of the contract covered all that was necessary.

Q. Did you advise the Chief of Engineers or the Secretary of War to make any supplementary contract with them?—A. Yes, sir; I was called upon for recommendation in the matter.

Q. And those supplemental contracts I assume were made without any competition with other people?—A. Yes, sir.

Q. There was an act of Congress in reference to this business at one time, was there not? I think it was about the last act, which authorized the Secretary of War either to go on with the present people or relet, as he thought the public interest required.—A. Every act of Congress that has appropriated money since the beginning has included that stipulation.

Q. Then it was on your advice to the Chief of Engineers that no new proposals were asked for, and the work was continued under sup-

plementary contracts with these same people?—A. Yes, sir; there were communications in writing to the Chief of Engineers setting forth the facts as they appeared to me, and giving my recommendations and views in the matter.

Q. Can you imagine any motive for a departure from the correct line of the tunnel by these contractors?—A. No, sir; I think it was simply carelessness on the part of the workmen up at the head of the drift in the darkness.

Q. We will now again take up this bundle of correspondence which has the War Department mark No. 4959 A, in red ink (Committee No. 156), and begin with Lieutenant Townsend's communications, following those I have already called your attention to, written by Captain Symons. The first is dated August 1, 1887, addressed to Beckwith & Quackenbush, which is merely a direction in regard to conforming to the lines of the tracing.

The next communication from Lieutenant Townsend is dated July 12, 1888, eleven months and upward afterwards, in which he states that he is directed by Major Lydecker to inform them that if any further attempts are made either to substitute dry stone for rubble masonry filling in the lining of the tunnel or to leave unfilled cavities in the backing their contract will be annulled. What did that statement at that date refer to?—A. That was the letter to which I referred in my testimony of yesterday, as referring to the bad work which had been found either at the time Mr. Masters was discharged or after both that and the first bad work was detected in O'Brien's section; I do not remember, specifically, whether that was written after the first or second of those events. I forgot to refresh my memory in regard to it by looking at the record.

Q. Is there or should there be any minute or any note in any book or paper in your office or in the charge of Lieutenant Townsend or anybody else connected with the United States that would show when the event or events to which this clause refers took place?—A. It should show on the daily reports of the inspectors and I think it does. There was a daily report received from each inspector, and that should be stated on it.

Q. He then proceeds to state that they are also directed to introduce power drills in the east heading, Foundry Branch shaft, without delay; that while arranging their pipes they will increase their force drilling in that heading until their rate of excavation shall be 20 feet a day, taking the men from Champlain avenue shaft for that purpose, or, if necessary, to reduce the force at any other place. He then says:

> As your attention has been repeatedly called to this subject the annulment of your contract will be recommended if your force is not immediately increased.

Now, I want to ask you, as an expert, how many repeated failures to comply with the contract and with orders to comply with it would be required before the actual annulment of the contract should take place, instead of repeated threats to annul?—A. I suspect that that is a question independent of the number of threats, as it would be of every other threat. I think threats were used largely to incite.

Q. I am serious about this business. How long would you think a state of things, such as I have represented, then for Captain Symons and now again by Lieutenant Townsend, should be allowed to continue until it was put an end to?—A. I think as long as a person who was responsible for conducting the work thinks it is to the best interest of the Government to keep one person at work rather than to make a change,

as long as he thinks that the purpose in view can be better subserved without the annulment of the contract, notwithstanding he is not doing all that is required.

Q. That might in certain places lead to a great favoritism, might it not; one contractor might be dealt with with more rigor than another?—A. Unquestionably.

Q. And another might be allowed to dawdle along indefinitely?—A. Unquestionably. I simply make my answer on the assumption that the officer or person responsible is honestly trying to do his duty.

Q. Could not favoritism exist without dishonesty, through kindness of heart, friendly bias, and a variety of considerations of that kind that did not involve a corrupt heart? Perhaps that is a question of ethics that you, as an engineer, are not bound to answer. That would be pretty obvious, would it not?—A. Yes, sir; what I meant to say is that the person should be actuated simply with a desire to do his best for the interest he has at stake. That is what I wanted to say.

Q. This letter of July 12 is followed by a reply from the contractors, in which they acknowledge the receipt of the letter of the 12th. They say that—

> If attempts have been made to substitute dry packing for rubble-masonry filling or to leave cavities unfilled it has been without our knowledge and contrary to our most stringent instructions.

That they are fully aware that such action would be an infraction of the contract, which it is their purpose to execute faithfully. There they leave that subject. After the introduction of power drills in Foundry Branch, east, they state as follows:

> First. The power plant was removed from that section in October, 1886, upon a decision of the United States engineer that no farther excavation would be required there, and that the normal section then completely excavated would be left without lining. The decision to line this section, whereby trimming was rendered necessary, was not arrived at until long afterwards.

Do you know anything about that?—A. I think that is substantially true, that a great deal of the tunnel for a couple of years was not expected to be lined, but it was subsequently determined to line it.

Q. Did not the Board of Engineers recommend a complete lining?—A. No, sir; they made no recommendation as to the extent of the lining.

Q. A complete lining, then, was a kind of development?—A. A development during the progress of the work.

Q. And a development after the holing was complete?—A. Yes, sir.

Q. They then say that at Foundry Branch, east, heading the trimming has reached a certain point, and that they expect to reach a final section, which they name, but which is not material to be stated here, in sixty days, and that, having removed the plant at Foundry Branch by authority, they call your attention to the fact that great expense and loss will result in obeying your directions, not due to their fault, and next, that it would not expedite operations if they did. Do you know whether they did remove that plant?

The WITNESS. Whether they did put in the power drill?

The CHAIRMAN. Yes, and remove the plant that is spoken of.

The WITNESS. I do not recall the moving of any plant.

Q. They speak of removing the plant, and say that from the section referred to by Lieutenant Townsend, Foundry Branch east, their plant for power drilling had been removed, and therefore, in order to comply with your directions that they should use power drills, it would be necessary that they should restore the machinery and plant.—A. Yes; but not new machinery.

Q. Was that done?—A. No, sir.

Q. Did your office abandon the idea of requiring it?—A. Yes; after verbal consultation with Lieutenant Townsend we made up our minds that the completion of the work would not be at all advanced by doing that.

Q. The next communication in this package is from Beckwith & Quackenbush, without date, but noted as having been received on the 19th of July, 1888, addressed to Major Lydecker. In this letter they first refer to your report published in the local papers, to the effect that they had not exercised due diligence in carrying out the provisions of the supplemental contract signed on the 8th of May, 1888. Did you make such a report?—A. I do not recall that. I think that must refer probably to a synopsis of my monthly report of operations.

Q. Just turn to your report in your book and see what you can find about it.—A. It must be either in my monthly or annual report. [Referring to page 245 of book of monthly reports.] I think it may possibly refer to that. The reporters of the local papers are in the habit of taking synopses of my monthly reports and publishing them.

Q. This entry in this book of your monthly reports, on page 245, is under head of June 18, 1888?—A. Yes, sir.

Q. And this heading of June 18 is a synopsis, if I understand, of a written report that you made to the Chief of Engineers?—A. Yes, sir. These are synopses from the monthly reports of operations.

Q. Then this is a copy of your report?—A. It is the office copy.

Q. A copy exactly of the paper you sent to the Chief of Engineers?—A. Yes, sir.

Q. You suppose that this statement, then, marked received on the 19th of July, 1888, wherein they impute to you having reported that they had not exercised due diligence in carrying out the supplemental contract, referred to this entry in your report of June 18, 1888, to the Chief of Engineers?—A. I think it must.

Q. The clause of that bearing on the subject appears to be this:

> The work of lining will be continued during July, but a much greater progress is to be expected, that made during the past month being by no means satisfactory, especially in the east head of Foundry Branch shaft. This contains the greater length of tunnel to be lined, and the completion of which will fix the time of completing the entire work

A. Yes, sir

Q. Why was not that work satisfactory, to which you refer in that report?—A. The rate of progress was not satisfactory. Every effort was being made to comply, as soon as possible, with the requirements of the last appropriation act, which demanded completion of the work by the 1st of November.

Q. Were they failing to do what the contract required?—A. No, sir; I can not say that they were failing to do what the contract required; I thought they could make better progress, however. To that extent they were failing to do what the contract required. They were, in my opinion, not doing all that they could to expedite the progress of the work. I thought their forces could be better distributed to accomplish the purpose in view.

Q. The contract of May 8, 1888, states in one clause:

> It being expressly understood that the parties of the second part [that is, Beckwith & Quackenbush] will use all means in their power to complete the work by the 1st day of November, 1888, and that all instructions from the party of the first part concerning the steps to be taken to secure completion on said date shall be promptly obeyed and rigidly adhered to.

Now I understand you to say that you thought they had not, down to the 30th day of June, or during the month of June—being the next month after the contract was made—complied with the contract in respect of the diligence to be used in pushing forward the work?—A. Yes, sir; they were not making the progress that I thought could be made.

Q. Did they obey your injunctions, if you gave them any injunctions, to proceed with more diligence?—A. They did better; they made a rearrangement of their force by which they increased the rate of progress in this east drift from Foundry Branch, which was the one in question, and where their progress was too slow.

Q. Did their progress under this last contract, after the 1st of July, continue to be of such a character as to be satisfactory to you, representing the United States?—A. Yes, sir; I believe they made as great progress as the conditions would admit.

Q. How many feet per month do you think they could do, using all the force practicable, and advance in the best and most sensible way?—A. Well, I think that a rate of 1,800 feet would probably be about what they could do and do justice to the work; possibly 2,000.

Q. They say in this communication, after reviewing the various circumstances connected with it—

> On the whole we find that about 1,300 feet of completed work per month is all we can do with the facilities afforded by the condition of the tunnel and the extent of our plant. We are, for example, working all the masons that our shaft plants can keep supplied with brick and cement. If we are to put on a heavier force of masons they would be idle some of the time for want of material.

Was there anything in the nature of the shaft itself that, with a suitable and adequate plant, would prevent carrying in material and taking out muck and rubbish faster?—A. Yes, sir; I think the shaft, as a practical question, was a little too small for the most expeditious work; I think larger shafts there would have admitted the introduction of larger cars and would probably have been a better thing from the start.

Q. Did you ever see their shaft plant at that shaft?—A. Yes, sir.

Q. Was it as good a one as could be provided for expeditious and powerful working?—A. I think it was perfectly sufficient for the purpose, so far as plant was concerned. They had good engines there and good platforms.

Q. So that the difficulty in the respect to which they refer, as to the extent of their plant, was not from the insufficiency of the extent of the plant itself, the plant being as extensive and powerful as the size of the shaft would admit to be worked, as I understand you?—A. I think so.

Q. So that there could be no ground of complaint against them in that respect?—A. No, sir. I had no occasion to find fault with them in that respect.

Q. How is it, then, that you thought 1,800 or 2,000 feet per month could be done?—A. I say that the work could be properly done. In my opinion the great delay was the amount of muck that had been left in the tunnel and not removed, piles of rock that had been broken from the roof in trimming.

Q. That had not been taken out?—A. That had not been taken out, and the consequent time lost and interference with the transmission of material required for the masonry.

Q. When was that muck, as it is called, left there; when did it come down?—A. Most of it was broken down after the resumption of operations, though some of it had been left in the tunnel when operations were closed.

Q. Whose business was it to remove that muck?—A. The contractors'.

Q. Why did they not do it?—A. I do not think they had sufficient force on the muck piles in the beginning; it had accumulated and got ahead of their force.

Q. Why did they not put on more force?—A. That is one of the principal points to which I referred in that preceding report—the question of the removal of the muck.

Q. Do you mean the report of June?—A. July. It was with especial reference to the lack of progress in that Foundry Branch heading; and the great trouble, so far as the progress there was concerned, was the fact that the muck or the rock had not been removed from the tunnel after being taken down.

Q. That was the thing you had in mind?—A. That was one thing.

Q. There is nothing stated in this report for June about muck, that I can see.—A. Probably not.

Q. Then follows a letter from Beckwith & Quackenbush to Senator Allison; I will only read this part, in order to bring the subject to your mind. They say that—

> After the approval of the act of March 30, 1888 [I suppose the urgent deficiency bill], pumping operations were immediately begun, the tunnel having filled with water during the suspension of work pending the appropriation of additional funds. Forty-one days were consumed in clearing the tunnel from the west connecting shaft to the crown of the easterly grade in Howard University shaft west, and the latter section was not fully dried until May 27.

Do you think that all the best means were taken by them in clearing the tunnel of water, or was that done by the Government?—A. That was done by the contractors.

Q. That was part of their supplemental contract?—A. Yes, sir.

Q. Was that cleared as quickly as it could be?—A. No, sir; it could have been cleared more rapidly, of course, by the introduction of more pumps. My recollection is that one or two extra pumps were put on; I am not certain about that; I am sure one extra pump was sent for, over and above what they had had and that had been perfectly adequate.

Q. The pumping machinery they had had before was not emptying a full tunnel?—A. No, sir.

Q. But merely keeping down the daily percolation and drift?—A. That was its purpose, and that same plant was used for emptying the tunnel when the resumption of work was authorized, they using at least one, and possibly two extra pumps. We had no such contract with them as would require them to put on pumping apparatus for the special purpose of keeping the tunnel free of water, it being filled at the time operations were resumed.

Q. Did not the contract, of which I have just read a clause to you, require that every step should be taken that should be directed by the engineer?—A. To expedite the work; yes.

Q. In reference to the whole work; everything that they were to do under the contract?—A. Yes, sir.

Q. Then why could not you, consistently with the contract, require them to put on an adequate pumping machinery, all that could be honestly, fairly, and vigorously worked?—A. I think the pumping machinery was adequate for the purposes required of it; I think the reorganization of their working force, getting the material on hand, etc., were all necessary preliminaries to the work; and that while it was a long time before the tunnel was emptied from one end to the other, yet there were points opened up within that forty days so as to admit of the beginning of operations, and a gradual increasing of the force.

Q. Then you had no occasion to find fault with the conduct or want of conduct in respect of clearing the tunnel of water?—A. No, sir; I saw no reason for finding fault in that respect.

Q. And you made no requirements of them?—A. No, sir.

Q. Are you sure about that?—A. I have no recollection of any further requirements than the suggestion of getting one or two additional pumps.

Q. That was a suggestion that came from your department?—A. That came from our office. There were one or two suggestions made. I think I recall another one—that after one of the shafts, possibly the Rock Creek shaft west, had been emptied of water, one of the pumps was removed from there and put to the eastern shaft also, as supplementing the working of the ordinary pumping plant at that place, that being the last shaft emptied.

Q. The communication in this package, already identified, is dated the 20th of July, 1888, and is addressed to you by Lieutenant Townsend, in which he submits remarks upon the letter of Beckwith & Quackenbush, inclosing a copy of their letter to Senator Allison, both of which I think I have already called your attention to. He says that he concurred in the opinion of the contractors that it is impracticable to finish the work by the 1st of November, 1888, but that their reasoning, both in the latter to Senator Allison and in the letter to you, is faulty, and that the statements on which they base their arguments are incorrect. Do you know in what respect Lieutenant Townsend thought their statements to be incorrect?—A. I do not recall them now specifically.

Q. He says:

They are now lining 84 feet of the tunnel a day instead of the maximum 50 feet stated.

That is stated in their letter as being the greatest they could do.

And they could readily line 100 feet per day, and would be compelled to do so if it would diminish the time of completing the tunnel.

It would seem, then, that according to Lieutenant Townsend's opinion there was nothing in the smallness of the shaft alone which prevented their doing as much as he first stated, or even more, per day. One hundred feet per day, leaving out Sundays, would be 2,600 feet a month.—A. It is possible they might make it if they had working forces at all parts of the tunnel. The point referred to there—when he says they might be made to do 100 feet a day if that would expedite the completion of the tunnel—the calculation on which the completion of the tunnel depended was the time in which the lining in the Foundry Branch headings could be completed; so that, if they wanted to make the maximum rate of daily progress in that head they might make a much reduced progress in the others.

Q. But I am on the simple question of fact of how much lining, with the shafts as they existed, could have been done during a day. A.—I gave it as my opinion that from 1,800 to 2,000 feet could be done in a month.

Q. He also says:

Nor is the fact that the University shaft was not pumped out till May 27 of any moment, as that shaft will be completed by the middle of August at the latest.

Was that shaft completed by the middle of August?—A. Not quite.

Q. Lieutenant Townsend says in this report to you that—

The time of completing the work depends not only on the number of men employed, but more particularly in the manner in which they are distributed. Some headings

have very little work to be done in them, while the east heading from Foundry Branch has to be lined throughout. The time of the completion of the work is therefore not a function of the general monthly rate of progress, but of the rate of progress in this longest unlined heading, and this should be kept as high as possible. The contractors have not made satisfactory progress in this heading; it was pumped out so that it could be entered the day the contract was signed, but at the rate at which they were working when the letter to Senator Allison was written this heading would not have been completed in a year.

Do you remember receiving this report from Lieutenant Townsend?—A. Oh, yes; I remember the fact.

Q. Did you make any communication in writing to Beckwith & Quackenbush about it?—A. No, sir; I did not.

Q. Did you make any oral communication to them?—A. There were oral communications almost daily made to Mr. Quackenbush.

Q. Did you make any oral communication?—A. Not with reference to that special letter that I know of; I did speak to Mr. Quackenbush on several occasions when he came in the office.

Q. I am on this supplemental contract.—A. I have no recollection whether I spoke to him in relation to that or not.

Q. Have you any recollection whether you spoke to him on the subject of the progress they were making?—A. Yes, sir; I spoke to him several times in relation to the rate of progress.

Q. What did you say?—A. I don't remember what I said.

Q. What was the substance of what you said?—A. The substance was that he was not making satisfactory progress in the Foundry Branch heading, and that he must make his arrangements to increase his rate of progress in that heading specifically.

Q. Did he obey?—A. He did obey finally. I think his progress was much increased in the latter part of the operations in that heading.

Q. So that, as you have already stated, it was satisfactory to you?—A. Yes, sir; the final rate of progress was all that I could expect.

Q. The next letter in this series is from Lieutenant Townsend to Beckwith & Quackenbush, dated July 19, 1888. It appears to be the same date when you received their communication which I have read before, in which Lieutenant Townsend says:

I am directed by Maj. G. J. Lydecker, Corps of Engineers, to inform you that the quality of brick being furnished is not up to the standard required by contract. A load of brick has been condemned at Rock Creek shaft, and a second at the east shaft. They will be removed without delay.

Tell us what you know about that part of the business.—A. I don't know anything about it further than the fact is stated there, that they were ordered to remove the brick.

Q. Was that the first time you had heard from anybody that the brick was not proper?—A. Oh, no, sir; there had been rejected material several times during the progress of the work—brick, cement, and sand; and on delivery and inspection at the work, if they were not satisfactory, they were sent away.

Q. I notice in this series of correspondence, as far as I have observed, this is the first time that any mention is made of any improper material.—A. This, I suspect, was the first time any letter was sent to them directing them to take it away.

Q. What was done in the other and previous cases? You say it happened several times.—A. Whenever the material was found to be unsatisfactory it was reported by the inspector or by the engineer, who determined the question finally. It was always removed from the work.

Q. It was taken away?—A. It was taken away.

Q. Have you any criticism to make in respect of any material that actually went into the work?—A. No, sir; I believe the materials were then good—brick and other material.

Q. This last letter was the 19th of July. Just a week afterwards, on the 26th of July, Lieutenant Townsend addressed another letter to Beckwith & Quackenbush, stating that you directed him to inform them—

That the Round Top cement used by you in the tunnel does not come up to the requirements of the specification. You will furnish us, as soon as practicable, some other sand and cement, sending a specimen to this office for test purposes. The limited amount of Round Top cement you have at the shaft can be used in the proportions of 1½ to 2 of sand if you so desire.

Do you know anything about that except what is here?—A. No, sir; I remember the fact that inferior cement was reported, and we determined that we would allow them to use it if they would increase the proportion of cement in the mortar, or put it in the work.

Q. How long had the Round Top cement been in use there?—A. It had been in use more or less from the beginning of the work.

Q. How did that happen, or did it happen, that this particular quantity that was then there was bad of its class?—A. I can not possibly tell how it happened that frequently batches of cement were delivered which varied in quality.

Q. From the same work?—A. From the same work. It is a question of what has happened to it from the time it left the work until it has come to the place where it is to be used.

Q. So that I understand that if this particular batch of Round Top cement happened to be bad it would not raise any inference that all other Round Top cement was bad?—A. By no means.

Q. The next letter is from Lieutenant Townsend to Beckwith & Quackenbush, dated September 1, 1888, in which he says:

I see by to-day's reports from inspectors that the directions given you in reference to the number of men to be employed in mucking at Foundry Branch, east heading, are not being carried out. There is reported a force of but five men working at the muck pile. The force will be doubled, five men on the day shift and five at night. This force must not be interfered with to clean foundations. If extra men are needed they must be taken from other headings.

Then the contractors were failing in respect of energy in regard to removing the muck; does it not appear so?—A. Well, it would appear, as I understand that, that on the day to which he refers the force of muckers was not up to the standard. I would not say that that necessarily involved the idea that they were negligent, because I know at times the laboring men do not turn up for work for a day or two. If that had continued for any considerable length of time, I should, of course, assume that it was their fault.

Q. Then it would seem, would it not, that from the beginning of operations of these people, to whom this contract was awarded under the circumstances you have already described, there has been a pretty frequent, if not constant, departure from their contract obligations in one respect or another?—A. In some respect or another, yes; principally in relation to not carrying out the work as rapidly as it was believed it could be done.

Q. That brings me to another question in the same connection: None of these failures and shortcomings which appear in the papers and which you have described, many of which do not appear in the papers, appear to have related at all to a failure to make proper filling and backing according to the contract, except in the special instances which at last came to your notice and were acted upon as you have already

stated. How does it turn out that that contract was performed, so far as your present information goes in regard to the condition of the lining and its backing, taking it in general as done by them?—A. So far as I believe now, because I can not actually know the condition of the lining, but from recent dévelopments, I believe there is a great deal of very defective work in the packing of the tunnel. The brick-work, the masonry work on the surface of the lining, is, I think, throughout of good quality and equal to all required. I have not seen any yet that was not fully equal to what was expected.

Q. Then for a long period of time in the course of putting in this lining by these people there was a steady failure to doing it properly?—A. I think so. I am satisfied of that now.

Q. But that failure was not discovered by you or your engineers until the time you have already mentioned?—A. It was not.

Q. The contractors had, of course, their own foremen?—A. Yes, sir.

Q. And their own engineers?—A. Yes, sir.

Q. And their own inspector, or whatever he might be called?—A. Superintendent.

Q. Do you think those, what are now understood to be extensive and continuous cavities and failures in regard to the backing of that tunnel, could have come into existence from day to day and month to month without their superintendent and foremen and engineers knowing it?—A. It hardly seems possible that it should so occur. I do not know that I would be justified in saying positively that it could not occur without their knowing it; it does not seem to be probable that it could occur.

Q. In order to get at it I will put the question this way: Supposing you had been the contractors' superintendent in charge of the actual construction of that lining, do you think that the thing could have gone on for the length of time it did, and to the linear distance that it did, without you knowing it?—A. Yes, I think it could. I think that a determination on the part of the workmen to do bad work and to conceal it from me in my absence could be put into effect by them; that they could cover up bad work.

Q. Would you not have dropped in upon them at some unexpected time or at a good many unexpected times, and suddenly?—A. It is not so easy to drop in unexpectedly and suddenly two or three thousand feet from the foot of a shaft in the tunnel. By codes of signals extended from the shaft up to the working force it is possible to give information to the people at the side of the work of the approach of one whose approach is to be feared at all by any one engaged in doing bad work.

By Mr. RYAN:

Q. That would imply that the whole force was in the conspiracy, would it not—a code of signals of that sort?—A. Not necessarily that the whole force was in it; I do not think that.

By the CHAIRMAN:

Q. Would the circumstance of the possibility of a code of signals, as you have described, have deterred you, had you been the contractors' superintendent and responsible for the due execution of the work, from attempting to drop in at frequent and unexpected times?—A. No, sir; there is no reason why it should deter me from the attempt.

Q. What could have been the motive of the workmen, for instance, to commit these practical frauds upon the United States; they were paid by the day, were they not?—A. I am not certain about that, as to

how the contractors did pay their men; it was a matter of which I had no knowledge, but I understand as a fact that they did pay their men by the day.

Q. Supposing you had been the foreman of that work in actual and personal charge of the laying of the brick-work and of the putting in of the rubble masonry and the mortar, do you think that at the heading where you were engaged as foreman of a gang such work could have gone on as appears to have been done, according to your present information, without you knowing it?—A. No, sir; I do not think the work could in any probability have gone on under the eye of the foreman in charge of the gang actually working at the place.

Q. You had a Government inspector at each one of those places where men were working, had you not?—A. Yes, sir.

Q. If it could have gone on without the knowledge of the foreman, could it possibly have gone on without the knowledge of the inspector?—A. Well, I think that the inspector might be deceived in relation to it. He is not quite so closely in connection with the work as the foreman, who is the man actually doing that kind of work. Their foremen, as I understand it, were working with the gang; I understand that one of the bricklayers acted as a foreman and was actually working with the gang.

Q. What was the inspector doing except watching?—A. He was watching a number of men, the bricklayers and the packers, and also he had to take certain measurements there in immediate connection with the work. I confess it is hard for me to see how an inspector could be right there and not see defective work done, particularly where large cavities were left. I can conceive that he might be occasionally deceived as to the amount of mortar put in, that some stone might go in without sufficient mortar backing, but I do not conceive it possible that he should see every stone that goes in and see how it is packed exactly.

Q. Did any of these inspectors, of whom we have a list, ever make any report of defective work or of a failure during the whole progress of the business?—A. I have no doubt that they have done so—the superintending engineer at some time; I have no recollection of it; I have no case in mind.

Q. You mean the Government engineer in immediate charge, I suppose?—A. Yes, sir.

Q. As, for instance, Captain Symons or Lieutenant Townsend?—A. Yes, sir; they would be more apt to make their reports to those officers on their rounds.

Q. Supposing such reports were made, would it be a part of the business of the engineer to make a minute of it in his note-book?—A. No, sir; not unless it was something of some considerable magnitude that was worthy of record. He would be very apt to take immediate action on the spot, as the executive officer, to have the defect corrected; that would be his natural course, I presume.

Q. I do not myself quite understand where you draw the line between what failures in the contract the engineer would make a note of the happening of, and what he would not.—A. Speaking for myself, if I, as the superintending engineer, saw defects of any considerable magnitude, and which I thought of sufficient importance to make a record of, I should probably do it; but the innumerable little defects that occur from day to day, and that I noticed by casual inspection, I do not think would be a matter of record.

Q. What do you think about those great cavities and the way they were filled, of which you spoke yesterday, where they were timbered,

etc?—A. I do not think that was regarded at the time as defective work; I do not think Captain Symons so regarded it; I think he regarded it as a piece of dangerous work done substantially as well as it could be done; that is my recollection of his opinion of that work at the time.

Q. Yes, but do you not remember one letter of Captain Symons's I read this morning where he referred to the entirely improper manner in which the timbering was placed?—A. That was a section timbered too low, and he gave the necessary directions.

Q. But I am on the point whether that would appear in his note-book at the time—about his inspector having reported to him that the thing was not going as it should.—A. If I remember that correctly, it was his own observation at one of his inspections.

Q. Then the inspector for the Government who was on the spot seeing it done made no complaint about it?—A. I will not say that he did not. I do not know what the facts were in the case. My recollection of that matter is that he says that he observed that they were not doing the timbering correctly, and that was the record of the facts.

Q. Have you made any computation or estimate since the 1st of October as to what it would cost probably to put the lining of that tunnel into a condition that you, on your own responsibility, would be satisfied with in regard to its stability for the purposes intended?—A. No, I have not had any sufficient data to make such a computation upon; I am endeavoring to get that data.

Q. Have you any impression at this time as to the probable cost, from such information as you now have?—A. It would be simply sheer guess-work for me to make any guess at it now; I can not say that I have any defined impression.

Q. You are not willing to express any opinion at this time?—A. No, sir.

Q. You are not prepared?—A. No, sir; I am not prepared to express any opinion.

The CHAIRMAN. I wish that as soon as you possibly can you would make a rough approximate estimate, based upon the information that you now have.

The WITNESS. Upon information that I now have?

The CHAIRMAN. Yes. Please furnish us that within the space of ten or twelve days, so that we can have an idea about it, based on your information and computations.

The WITNESS. I think I can within that time get such information as will enable me to make a better guess than I can now.

The CHAIRMAN. Say by the 15th of December; and do the best you can within that time, so that you can give to us on the 15th of December, or just about that time, the best approximation you can as to the cost of putting the lining of that tunnel into a condition that you would be willing to be responsible for; of course I mean in the moral sense, one that you would be perfectly satisfied with yourself, as capable of fulfilling the purposes for which it was designed.

(2) Then give us an estimate of the total expenditure, aside from that, for the absolute and final completion of the tunnel and its connection with the two reservoirs, so that all there would be to do would be to open the gates and let the water through.

(3) Then please furnish us the best estimate you can make of the total expense of every character of putting the new reservoir into a final and completed condition, ready to receive the water that should come under the last preceding head of inquiry.

The WITNESS. I understand that to refer to the condition of the

reservoir necessary to receive the water, not to the finishing of the ground, the fencing, or anything of that nature?

The CHAIRMAN. Yes; we should like the whole thing. We want to know, as nearly as you can inform us, what it is going to cost to have it done and put in use, with the last bit of varnish and the last placing of connections with the pipes that are to take it to the city. That would include the stop-valves, the gates, and everything else for the water that goes into the new reservoir as well as comes out of it.

(4) Then I wish you would get up, as of course you can easily, the best estimate you can in regard to a permanent pumping plant at Rock Creek, stating the necessary quantity of land for building an efficient and convenient plant there, the expense of the buildings, machinery, and connections all in order for use ready to light the fires under the engine and set it going.

(5) In that connection also please state the daily and the hourly capacity of the kind of pumping machinery that you estimate for, and thereon found a computation and result as to the number of days required with that machinery to pump the tunnel clear of water below the level of whatever blow-off you have, all that would be required to be pumped.

(6) Please furnish also a statement of what other pumps would be required to pump at the depressions that the main pump at Rock Creek would not reach, and how many would be required at different places.

(7) In that same connection I want to know what time would be required to pump it clear of water, supposing the lining to have failed somewhere, so that all the water exterior to the lining, in any of the crevices of the rock or otherwise, would have to go out too; that is, to pump out the quantity of water that you pump out when you clear the tunnel, as it is now, which would be the same, unless there are new cavities that have been developed later than the greater part of the lining which you put in.

(8) Then I want to know what you would estimate to be the yearly expense of keeping that permanent plant in a state of waiting until it is needed to be used in order from year to year.

By Mr. FAULKNER:

Q. Will you state whether or not you paid extra compensation for the trimming of the interior of the tunnel for the purpose of lining it throughout?—A. I do not know exactly what interpretation to apply to that term "extra."

Mr. FAULKNER. I mean, say it was rock excavation that you were to pay so much extra for, under the original contract.

The WITNESS. So much per cubic yard?

Mr. FAULKNER. Yes, of course; the trimming was more expensive than digging out the original excavation.

The WITNESS. Yes, sir.

Q. Did you pay any extra compensation for that?—A. We did not; we simply paid the original contract price for the excavation. The enlargement of the tunnel under the lining section was paid for at the same rate per cubic yard as all other excavations.

Q. When did you finally decide that it was necessary to entirely line the tunnel from one end to the other?—A. It was after the tunnel had been holed through entirely, and after a close inspection of the rock from one end to the other. That was in the summer or fall of 1887; it was just about the time operations were suspended, when the last appropriation was exhausted, and about the time and on account of the

closing up of the work; about that time we went through and made a careful examination of the work from one end to the other.

Q. The fact that that lining had to be made I suppose increased the length of time and the construction of this work, did it not?—A. Yes, sir.

Q. By a proper inspection of the excavations when they were being made could you not have ascertained, as an expert, prior to the entire completion of the excavation of the tunnel, the necessity of putting in that lining?—A. No, sir; because you could not judge from the excavation at one point what we would reach 25 or 50 feet from there, where the character of the rock was still concealed; the transition was sometimes very quick.

Q. You had how many shafts sunk?—A. We had five shafts sunk.

Q. In a length of 4 miles?—A. In a length of about 4 miles.

Q. Could you not judge, as an expert, from the excavation at each heading of those shafts, what would be the supposed character of the excavations between the different shafts?—A. No, sir.

By Mr. MCMILLIN:

Q. On that same subject, could you not have determined at the end of any half mile of excavation, say, as well as at the completion of the whole, whether that half mile would require lining? If not, what would stand in the way of it?—A. In general that could be determined. In certain characters of rock, however, it could not, because the condition which called for the rock did not make itself apparent except after the expiration of a period of time varying from two to four months; that was due to the decomposition of the rock under the action of the atmosphere on exposure.

Q. Do these strata there lie horizontally, or at an angle?—A. At an angle.

Q. What is the angle?—A. I do not know; it varies; I do not remember what the angle of the dip is, though I think it is recorded in some of our reports.

Q. In this geological formation is it not a fact that the rocks which lie at angles are generally broken up so that they are unreliable as a conduit for holding water, or anything that would seep through?—A. It is variable; I think that probably half of this tunnel would hold water; I think fully 10,000 feet of the tunnel would hold water without lining—8,000 feet would, anyhow.

CURTIS McD. TOWNSEND—Recalled.

TUESDAY, *November* 27, 1888.

Lieut. CURTIS MCD. TOWNSEND, recalled and further examined.

By the CHAIRMAN:

Q. State, if you know, the date when you first discovered the bad work under Masters.—A. I do not remember the date of the first bad work under him, but it was within a few days of the second bad work.

Q. A few days before?—A. Yes; a few days before. I have here the reports as to the cases of bad work discovered. I now produce the reports of June 28 and June 29, 1888; those are reports of the complete examination that was ordered.

Q. Have you the report of the first bad work?—A. No, sir; that I discovered myself.

Q. Did you carry a pocket note-book, or anything of the kind, as engineers usually do?—A. No, sir; not in the tunnel.

Q. This second bad work to which you were referring took place under the inspection of Masters?—A. Yes, sir.

Q. Had you stated yesterday how you came to hear about that?—A. Yes, sir; I had requested if any bad work was again discovered under Masters that the work should be stopped and that I should see it, and Mr. Kirlin came to me and informed me of it. I made an error in my statement yesterday in regard to the size. I find, upon examination, that instead of being a little over 30 feet it was over 42 feet of bad work that was torn out, and there were three bays of the key torn out, all brick. In regard to the dimensions of the hole above the arch, I examined the cross-sections that we have, and it was pretty close at that point, all the cross-sections which are recorded on the map showed, extending from 1 to 2 feet.

Q. Did Kirlin tell you, in reporting this matter of the 28th or 29th of June, how he found out about the bad work?—A. He reported to me that he had discovered it that morning just before coming to me. He said that in going through the tunnel he had found this piece of bad work, and he immediately came to the office to see me.

Q. It did not, then, so far as you were informed, come from a report of Masters to him?—A. No, sir.

Q. Is this a daily report, as you call it?—A. A daily report; yes, sir.

Q. This one that I now have is for Foundry Branch east shaft, for the twenty-four hours ending 6 p. m., June 28, 1888; it states the number of men employed as follows: Top men, 2; engineers, 2; blacksmiths, 2; 1 animal; that is under the head of shafts. On the east heading: Length of tunnel enlarged, 10 feet; muck removed, 17 loads; foreman, 1; pitmen, 42; brick mason, 1; stone masons, 2; laborers, 10. Under the head of "Remarks" it states:

Force pushed trimming from station 4+95 to station 5+5, and trimming roof from station 5+5 east; force trimming sides from station 5+85 to station 6+50. Brick-masons are placing lining from station 2+86 to 3+42. Force removing key and dry packing and replacing the same will report condition to-morrow. Muck removed from station 4+65 to station 4+75.

This is signed by O. H. Briggs, subinspector, and forwarded by G. H. Kirlin, inspector. That was delivered to you?—A. Yes, sir.

Q. And you on the same day indorsed it "Examined and forwarded." You forwarded it to Major Lydecker, I suppose?—A. Yes, sir. Those are the initials for the examination later.

Q. I see this first paper is signed by O. H. Briggs as subinspector; what reference has that to Masters?—A. Mr. Briggs was an assistant inspector to Mr. Kirlin, and took charge, under him, of the western portion of the tunnel and inspected it.

Q. And he would be a person superior in station to Masters?—A. Yes, sir; he took charge of Rock Creek and Foundry Branch shafts, both east and west.

Q. Overlooking all the inspectors in that part of the tunnel?—A. Yes, sir.

Q. The next day's daily report, June 29, shows really a note of what took place, but does not give the statistics as to the number of men, etc. Here is an entry that reads in this way:

Packing section examined by removing one arch and replaced from station 3+28 to 3+42; from station 3+28 to 3+42 5 feet down from key on north side packing

laid dry; no cement used; and on south side 3 feet down from key packing found a breach, Briggs leaving good packing below; from station 3+28 to 3+42, from station 3+42 to 3+56, packing was placed without cement; from station 3+56 to 3+70 packing removed and replaced from stone side walls up; key removed from three bays and found packing all right.

Q. What is the length of a bay?—A. A bay is one-third of a center; those three bays would be removed from the center; that is from 14 feet.

Q. And a center is 14 feet in length, as the term is used there?—A. Yes, sir.

Q. Stating it in a lump, just describe how extensive that defect was.—A. There was a distance of 42 feet dry packing upon the sides of the arch extending from one bay over the key. Between the stations mentioned there there was on one side a vacant space left. Besides that, the key was removed back for a distance of 14 feet, and found to be solid through that distance.

Q. From your knowledge of the work, how long a time do you think must have been required for workmen to build that 42 feet of lineal distance of lining?—A. Very nearly a day.

Q. How many rings were there in the brick-work there?—A. Two rings. It was only partly built; it was half-way up the haunches on each side of the brick-work, and they had commenced at the end of the keying.

Q. Where they had not commenced keying and where it was only partly built up at the sides this defect would be open to the eye of any person walking along?—A. Yes, sir; if any person should get up on the scaffold he would see it.

Q. How high above the foot-walk was it?—A. As I remember there was one length of 14 feet which was only about six to eight courses of brick above the side wall; that would be from 24 to 30 inches above the side wall, and then that would probably be 3 feet above the brick. So that it would have been difficult to look into without getting up on the scaffold at that point. Then going back another center, the brick-work was eight courses higher. There it would have been utterly impossible to see without getting up on the scaffold. Then the remainder of the work had been partially keyed over. You might have seen a little of the key from the ground, but not much. If you had made a thorough examination you would have had to get up on the scaffold.

Q. But it would have been a perfectly simple thing for anybody to see who wanted to?—A. Yes, sir. I will say, in regard to that, that there was cement mixed in with this dry packing; that in places it was thin, in coats or layers, but it was a mass of dry packing. When I went there I found in one section of it that the work looked well, but this dry packing had been discovered at one end, and upon digging into the other it also developed this dry packing.

Q. Who was the foreman of this particular work at that time?—A. A man by the name of Terrell.

Q. Do you know his first name?—A. No, sir; I do not.

Q. Do you know what has become of him?—A. He was in Chicago, I heard, during the investigation before the court of inquiry.

Q. Do you know the names of any of the men under him?—A. No, sir.

Q. What has become of them?—A. I do not know what has become of them; they were discharged from the tunnel at that time.

Q. Who was the contractor's superintendent at that time?—A. Their superintendent was Leroy. Two were present when I arrived at the work, and he was one of the subcontractors.

Q. Do you know where Leroy can be found?—A. I think he can be found at Mr. Quackenbush's office.

Q. What is his first name; do you know?—A. I couldn't tell you that.

Q. Where is Mr. Quackenbush's office?—A. In Georgetown, one door from the corner of Thirty-first street.

Q. On Bridge street?—A. On M.

Q. You say Brennan was present when you went there?—A. Yes, sir.

Q. That was on the 29th?—A. That was on the 28th.

Q. What did Brennan say, if anything, on the subject?—A. I spoke to him pretty sharply in regard to the matter at the time, and he protested that he didn't know anything about it; that it was as new to him as it was to me; and I told him that if anything of this kind occurred again there would not be a stoppage with the discharge of the underlings, rather intimating that he would be discharged. Still, he protested that he did not know about it; that he was sorry that it had taken place, and that he would try to see that the same thing should not occur again. That is about my remembrance of the conversation.

Q. Did you see Mr. Masters on the 28th or 29th of June?—A. No, sir; he had left the tunnel before I arrived. He had been notified, at the time I observed the other bad work, that upon the finding of an other piece of bad work it would insure his discharge, and he never waited for my appearance. I have never seen him from that time to this, until he appeared as a witness before the court of inquiry.

Q. Has he received any pay from that time?—A. No, sir; he was discharged at that time.

By Mr. McMILLIN:

Q. What was the rate of his compensation?—A. Seventy-five dollars a month.

Q. Did Masters undertake to state why he failed to see the bad work?—A. No, sir; he did dot make any full explanation.

Q. Did he say anything which led you to form an impression at that time as to how the thing could have been done without his knowing it?—A. He did not say anything at all. I formed an impression at the time that he would simply stand in one place and pay no attention to the rest of the work; that he was simply incompetent, and did not have the energy and push to get around from place to place.

Q. Why did you not dismiss him then and there?—A. The man had been appointed not on my recommendation, and I had a feeling that I ought to give him a second opportunity. I spoke to Major Lydecker about him; went to him and explained to him that I had given the man a second opportunity; that I had a little delicacy about discharging a man that I had not recommended, as he was about the only one on the force that I had not recommended. The major then told me that on the next offense to discharge him on the spot.

A. Did Masters come there before you did?—A. He was there before I was, but in the organization of the force I recommended most of the men who were employed.

Q. Were the employés there paid by the day?—A. Yes, sir; I understand they were paid by the day.

Q. Then the more rapidly they worked, of course the more rapidly the job would expire?—A. It was to the advantage of the contractors.

Mr. RYAN. Does it appear in the examination anywhere when this work was done?

The CHAIRMAN. This daily report is dated the 28th of June, showing when the event took place.

By the CHAIRMAN:

Q. When was the next occasion when you saw or heard in any way of anything going wrong?—A. I saw, a few days after that, a trivial piece of work that had been done under McNamara; there was really an excess of mortar used at that time, but I noticed that close to the wall they had not got the mortar thoroughly in back behind the stone. I do not think I ordered that work to be taken out; I just had the mortar thrown in by the trowel at this place.

Q. You thought that was a mere accidental occurrence?—A. Yes, sir.

By Mr. MCMILLIN:

Q. Do you think that Masters's failure to see a whole day's defective work could be attributed to his standing in one position, or just simple failing? Is that compatible with his innocence in the matter in any regard?—A. He is a man upon whom workmen could easily impose; they could have taken a trowelful of mortar and spread it upon the work, and then if he turned to go to another place, they could easily have deceived him. I do not think he was criminal or corrupt.

By Mr. RYAN:

Q. He was a very stupid fellow?—A. Stupid, that is it.

Q. Who recommended him?—A. He was recommended by Mr. McComas.

By the CHAIRMAN:

Q. Passing the small accidents that you have already described, what next?—A. There was reported to me on July 10, 1888, in the daily reports, one dry packing in Howard shaft, but that the matter had been corrected. Here is the report of that day (producing report).

Q. You produce daily report for the twenty-four hours ending July 10, 6 p. m., at the Howard shaft, which shows as follows: Under the head of shafts: Top men, 1; engineers, 2. Under title of west heading: Length in feet, side-wall section, 34; length in feet, packing section, 34; muck removed, 25 loads; foreman, 1; pitmen, 15; stone-masons, 3; laborers, 8. This does not appear to be signed by the subinspector; it was signed by Kirlin.—A. That was on the other end of the line, and there was no subinspector upon that end, with the exception of Lucas, who acted in that capacity at Champlain avenue, but was not recognized as subinspector and did not receive the pay. I was desirous of finding some man to take that position, and held it open during the time; but it was never filled.

Q. But you had a man named Lucas actually there?—A. Yes, sir; Lucas took the position in Champlain Avenue shaft, and he inspected the other inspectors; but in Howard shaft there was only a small piece of work done, and the only inspector over them was Kirlin.

Q. Under the head of "Remarks" this appears:

Force trimming foundation and removing muck. Masons finished placing south side wall from station 2+50 to 3+18; discharged one stone-mason for laying work dry; had wall taken down.

Is that Kirlin's handwriting?—A. Yes, sir.

Q. And this was examined and forwarded by you to Major Lydecker on the same date, I see.—A. Yes, sir.

Q. How did you first learn of this defect; from this report?—A. All that I learned was from that report; the matter was corrected, and

it is my impression that that was discovered by the subinspector himself.

Q. Lucas?—A. No, not Lucas; I can't think of his name.

Q. But the man actually stationed at that spot?—A. At the spot; yes, sir; the inspector's name was Thomas; it occurs to me now.

Q. And your understanding is that the inspector, in the course of his duty, discovered that?—A. Discovered it.

Q. To your knowledge was any communication made to the contractors on the subject?—A. About this time I called Leroy to the office and had a long conversation with him in regard to the work, criticising it; the contractors were absent at this time and I advised him to have the contractors return, saying that the work was going on in a very unsatisfactory manner, not only in regard to this particular work, but in regard to the manner in which the excavation was being done. I received an order from Major Lydecker to accelerate the excavation on Foundry Branch; he was not satisfied with that work, and I had a long conversation with him, and on several days at different times with Mr. Leroy also, in regard to this matter.

Q. But you made no communication in writing to the contractors?—A. I made no communication in writing until a little later.

Q. Did you make any in respect of the preceding instances you have already described?—A. No, sir; I spoke of these instances after July 2 to Mr. Leroy, who was representing the contractors, but I did not make a written statement until the 12th of July.

Q. You may now go to the next instance of evil that you saw or heard of.—A. The next report was from July 10 to July 12—one of those three days, I am not sure of the exact date. I received a note from Mr. Kirlin requesting me to meet him at his office at the Champlain avenue shaft, and it was marked "urgent" when it came to the office in the morning. I went there, and he reported to me that they had discovered that morning, on a piece of work that O'Brien had been inspecting the night before, a series of hollow places at intervals.

Q. Making a series of built-up pockets?—A. Built-up pockets. He described to me the incident, and we had a long talk in regard to the matter, and then I had a long talk with O'Brien. I then made what I considered a pretty thorough examination of the matter, and Kirlin informed me, after having described what had been discovered, that he considered O'Brien one of his best inspectors; he said that O'Brien stated that he had misunderstood Kirlin's orders; that he had left these men to do this work, and had gone to attend to another piece of work. Kirlin's understanding of his order was that he had told him to stay with these men and not to leave them until the work was completed; he was not quite sure, however, but what Mr. O'Brien had misunderstood him; O'Brien informed me that he had so misunderstood him, and thought these men could be trusted for a few hours. I came to the conclusion that O'Brien had been deceived. He was a good inspector, but I cautioned him that if this thing occurred again he would be discharged, and warned him in regard to leaving men, no matter whose orders he received to do so, and gave directions for the work to be properly filled in.

Q. Was it filled in?—A. Yes, sir.

Q. Do you know that personally?—A. I have drilled one hole into that place and found it solid.

Q. What was the extent of that piece of wrong-doing?—A. I have here a description, by Mr. Kirlin, of the size. Here is a description

forwarded to me July 17, at my request, of all the work that had been discovered by Mr. Kirlin up to that time:

WASHINGTON AQUEDUCT TUNNEL,
Champlain Avenue, July 17, 1888.

SIR: Herewith find report of stations in which packing was not properly placed and side wall laid dry back side.

Howard shaft: Side wall removed 2 feet down from station 2+44 to 2+50. Laid dry 6 inches from place of wall. Mason discharged.

Rock Creek, east: No packing placed in on south side of key 3 feet down from station 17+54 to 17+59. Mason discharged.

Rock Creek, west: Arch not packed on top from station 3+28 to 3+42, with bulkhead built across. Two masons discharged.

Foundry Branch, east: Arch not properly packed from station 3+28 to 3+70. In places packing was placed in dry. Other places bulkhead built and no packing. Three persons discharged.

All of the above defective work was removed and properly placed in.

Respectfully submitted,

E. H. KIRLIN,
Principal Inspector.

C. McD. TOWNSEND,
First Lieut. of Engineers, U. S. Army.

Q. There appear to be four separate places mentioned by him in that report. How many and which of these are those you have already spoken of?—A, Rock Creek east is the one I have not mentioned.

Q. Did Kirlin refer to Rock Creek east in his daily report?—A. No, sir; I do not remember having seen any mention of that up till that time.

Q. Have you his daily report for that day or for that period of time?—A. I examined it when I went to my office last night.

Q. And nothing appears in that about it?—A. Nothing appears in that in regard to it. At that time I had the impression that I had never heard of that one case.

Q. I understand you to say that down to the 17th of July, the date of this special report, the cases stated in it are all that had come to your knowledge of bad work?—A. No, sir; those were cases which had come to Mr. Kirlin's knowledge. There was one case of work torn out, the first case in regard to Masters.

Q. And that you have already mentioned?—A. Yes, sir; Mr. Kirlin did not know about that.

Q. Does this report cover all that had come to your knowledge down to the 17th of July, except those which you have already mentioned?—A. Yes, sir.

Q. In this last instance that you have spoken of yourself as seeing, who was the foreman of the contractors?—A. There was no foreman present; there were two masons left with the work.

Q. And their helpers, I suppose?—A. Their laborers passing material up to them.

Q. Can you imagine any motive which would lead those masons who were working by the day to do that thing?—A. Yes, sir; the work there is in a very bad atmosphere, and it is almost at times unendurable. They have had at times to stop work on account of the state of the atmosphere, and at the best it is a disagreeable job. I have recognized from the first that workmen would not work there without close supervision.

Q. What was the difficulty in having that particular part of the tunnel properly ventilated, so as to have a good atmosphere?—A. Until the headings were opened the only ventilation that you could get in the tunnel was by means of the air forced in for the purpose of working

the drills; after they were opened, there were some days of very fair atmosphere in some of the headings; it would depend a great deal on the direction of the wind and the temperature of the air above. When a blasting would take place in the tunnel, with the current moving in one direction, the headings would be filled for a time with smoke; then the smoke of the lamps would also tend to increase that bad atmosphere; and, as I say, if the wind was in the wrong direction, the heading would have very bad air.

Q. But what was the difficulty, if any, of carrying in a ventilating pipe and forcing fresh air in for the breathing of the workmen?—A. It was practically a question of expense; there could have been a larger supply of fresh air given.

Q. How far was this particular place of which you are speaking, in regard to the possibility of the masons committing that fraud on account of the personal discomfort they experienced in working, from a shaft?—A. I was speaking of that in a general sense, not particularly in regard to this case. This case was a little over 300 feet from the Rock Creek shaft, and in one of the best ventilated portions of the tunnel, generally speaking.

Q. Then your solution of the question of motive would hardly apply to that particular instance?—A. Not particularly to that instance.

Q. Can you imagine any other motive?—A. Laziness.

Q. You say the contractor's foreman was not there at the time, as you understand. Can you imagine any other motive that operated upon these two masons to cause them to commit that fraud?—A. A second motive would be laziness.

Q. That is, appearing to have done a good day's or night's work when they had not?—A. Yes, sir; sitting down and doing nothing.

Q. Can you think of any other motive?—A. I can think of a man being purchased to do this work.

Q. That is, having been corruped?—A. From corrupt motives.

Q. That would necessarily be in the interest of the contractors only, I suppose?—A. Yes, sir.

Q. If the bad work was not discovered the contractors would thereby get pay for work that had not been performed?—A. Yes, sir.

Q. What did you do in regard to those two masons who had been guilty of this misconduct?—A. I ordered them to be discharged.

Q. Were they discharged?—A. Yes, sir; I was told that they were.

Q. Do you know their names?—A. No, sir, I do not; though I could obtain the name of one of them; it was mentioned before the court of inquiry, but I forget it at this moment.

Q. Does any paper or report of yours give the names?—A. No, sir; none of the employés of the contractors were reported to me except by number, not by name.

Q. Why did you not take a note of their names, if you directed them to be discharged, so that you would know and be able to identify the men if they should happen to appear on another part of the work afterwards?—A. I should not have known them by name; I did not know the names of the masons, and I would not know them well enough by their names if their names did appear.

Q. Kirlin will probably know?—A. He will probably know the names of the masons.

Q. How do you know that they were dischaged if you did not know their names?—A. I was told by Mr. Kirlin that they were discharged; that is the only information I have upon that point.

Q. Mr. Kirlin told you that your direction had been complied with?—A. Yes, sir.

Q. Did Kirlin make, as general supervising inspector, daily reports of the character, as to form, etc., of these, every day?—A. Every day; yes, sir.

Q. But in this particular instance, if I understand you, it does not appear in his report?—A. It does not appear. He called me right up there that morning and requested me to go to the shaft and inspect it.

Q. Can you fix that date?—A. It is my impression that it was July 11, but I would not be sure of that.

Q. Tell us the next time when you heard or discovered anything wrong?—A. The discovery of bad work stopped after that. I saw very little bad work after that. There may have been trivial occurrences, such as walls requiring to be touched up; and I would find places where I thought a little more cement should have been used, particularly at this back part up close to the wall, which was a weakness that I used to examine into considerably. But I found, from that time until the work closed in September, very little bad work, nor was any reported to me. I think there were one or two times that they reported that the inspector had discovered bad work and a mason had been discharged.

Q. Does that appear in the daily report, this last thing you mentioned?—A. No, sir; that does not appear in the daily report.

Q. Do you know why the inspector under Kirlin, or why Kirlin on the report of that inspector, or from what he saw or learned of the man, did not put in this daily report these occurrences of wrong-doing, even if they were remedied?—A. Kirlin would see me almost every day. I would go out of the shaft very frequently and would discuss matters with him and there was a great deal of verbal discussion. I would very frequently speak over these matters with him there at the shaft. Sometimes affairs would be reported by him to me on little slips of paper inclosed in daily reports, with a request that he would like to see me in regard to some matter. I used to go out to the shaft at these times.

Q. If I understand you, then, from the 17th of July, the date of this last paper of Kirlin's which you have produced, down to the time when the thing stopped, you saw and heard of no bad work that was not immediately corrected?—A. That is correct.

Q. Did you see or hear of any bad work, even if it was corrected, that would raise any inference or suspicion that it was intentionally bad?—A. No, sir; I did not.

Q. All that occurred afterwards, then, that was not what it should be, was such mere accidental and trivial imperfection as might occur in any well-conducted enterprise; is that what you mean?—A. Yes, sir; that is what I mean. I have an impression of one or two little places, and that Mr. Kirlin spoke to me of there being a pocket of dry work, and that he had ordered the discharge of the mason who had put it in. I know specifically of one case after this investigation was started, just at the close of the work, within a day or two, when there was a mason discharged in Rock Creek for doing this kind of work.

Q. Did all that sort of thing put together—even including what was discovered at the time, so far as it was discovered and corrected, and the discharge of the masons—lead you to suspect that there might be other imperfections of the same character—frauds, in point of fact?—A. No, sir; I thought the inspectors were discovering every attempt that was being made. I attributed these discoveries to the efficiency of the inspector and thought that they were discovering all bad work of any

material amount, anything that would in any way endanger the stability of the arch, but I thought at this time that there was carelessness on the part of the contractors and that that carelessness needed correction.

Q. What do you mean by "this time?"—A. July 12. I had several talks with Major Lydecker in regard to the matter.

Q. Was it your duty to communicate directly with the contractors under Major Lydecker's directions?—A. I usually communicated with the directors.

Q. Did you make any communication to them on the subject of these repeated instances, that had come to your knowledge in any way, of bad work of the character that we are now speaking of?—A. Yes, sir; on July 12, at Major Lydecker's request, I wrote a letter, of which I have a copy here.

Q. We also have a copy of that letter on our files. At the time you wrote that letter what was your belief or opinion in regard to the frequency and nature of these faults in not filling behind the lining, according to the contract?—A. I was of the opinion that the contractors were careless, or that there might be some attempt at some kind of criminal work that was being done in the work; that was the decision.

Q. Their reply to this communication, I see, says that if anything of that kind happened it was without their knowledge and against their instructions, and so on. Did you believe that?—A. Yes, sir. I did not think they had given any direct instructions for that kind of work. I thought their force was not properly organized; that they were depending too much on our inspectors; and I was determined to see that they had a sufficient force of themselves to supervise the work and to see that it was properly done without depending at all upon our inspectors for that.

Q. Did you or not believe, from what information you then had, that Beckwith & Quackenbush, or either of them, were in any way privy, otherwise than by want of organization and neglect, to these frauds that were turning up?—A. I was afraid that they might be, but nothing more than that; I had no reason, other than the feeling that this kind of work with which they were connected in New York might be a reason why they should attempt to perpetrate some of that kind of work on us.

By Mr. RYAN:

Q. There was the same class of bad work in New York?—A. Yes, sir.

By the CHAIRMAN:

Q. They were the people connected with that work, were they?—A. Yes, sir.

Q. I think you have just said that after the 12th of July, when you wrote this letter to them, down to the time the work stopped, no bad work of any extent was discovered?—A. That is what I said.

Q. And that your inspectors appeared, as far as you could ascertain, to have been vigorously doing their duty and discovering every failure as it occurred, and causing it to be rectified?—A. Yes, sir; that was my opinion.

Q. Does that account for your not having executed the warning that you gave them, that you would annul the contract if any further attempts were made in that direction?—A. There was nothing that I considered as a serious enough attempt to justify me in annulling the contract from that time on. In fact their organization was very much improved. They had placed on duty more inspectors, more superin-

tendents, and more men to look out for the work; they seemed to be more active about it.

Q. Did any person, at any time or in any way, directly or indirectly, by writing or speech, attempt to approach you in regard to your overlooking any faults or errors?—A. No, sir.

Q. So that if anybody attempted to corrupt anybody, no attempt was made as respected the officer in general charge at all?—A. No, sir.

Q. Have you ever heard, no matter how, by rumor or in any otherwise, or by hint, of any attempt or proposal, whether successful or not, of the same character I have last mentioned in regard to Kirlin?—A. No, sir; excepting what has appeared in the papers.

Q. In the newspapers, you mean?—A. In the newspapers at the time these charges were first made. The Kendall Brothers hinted that Kirlin had been corrupted by Palmer.

Q. And that was the first you ever heard of that?—A. Yes, sir.

Q. And all you know about it is what you have read?—A. Just what I have read.

Q. Did you ever hear of any attempt of any kind, in the nature of those we are now referring to, as regards any of the persons employed by the United States as inspectors, or subinspectors, or anybody else?—A. I heard it in regard to Lucas a few days before he was suspended; I heard a rumor at that time that he was wanting to be bribed.

Q. How did you hear that rumor?—A. That rumor came from a workman employed on the west connection, telling a superintendent of the west connection, and he told me about it.

Q. What was the name of the superintendent of the western connection?—A. Smead.

Q. What was his first name?—A. I don't remember; he is not upon the tunnel; he is the superintendent of the Washington Aqueduct.

Q. Did he tell you the name of the workman?—A. He did not.

Q. Where does Smead live. What is his address if you know it?—A. His address is Washington Aqueduct office, on the other side of the bridge in Georgetown.

Q. Is that the only instance that you remember of hearing in any way of persons being corrupted or approached to be tempted to be corrupted?—A. I questioned Mr. Kirlin in regard to this very same thing, and he said he heard something of that kind in regard to Lucas.

Q. Did Kirlin say whether he had heard that Palmer was the author of the event that he heard of. I think you said Palmer?—A. I did not say that I heard it from Palmer; I heard it from Smead, and then from Kirlin. It was more that this man wanted to be bribed than that he was corrupted.

Q. Have you now stated all the instances of which you have heard, of any attempt, successful or otherwise, to corrupt or attempt to corrupt anybody in the employ of the Government?—A. Yes, excepting as to the evidence appearing before the court of inquiry, in which I heard testimony that O'Brien had received $25 a month from Palmer. I was seated in that court of inquiry and heard that testimony.

Q. I wish you would tell us what your present knowledge is as to the condition of the lining of that tunnel all the way through, as a whole, in regard to these imperfections and defects, whether fraudulent or accidental, no matter. I mean its physical condition.

The WITNESS. You desire what I have seen. I have been listening to testimony for weeks.

The CHAIRMAN. State first what you have seen.

The WITNESS. I inspected the tunnel myself, and drilled a number

of holes in the roof and sides in the portions which were covered by the affidavits that were made by these Kendall Brothers and Lucas.

Q. About when did you begin that inspection?—A. I can not state at this instant, though I know and testified in regard to it at the court of inquiry. It was within about a week of the time the Kendall story first appeared. At first I could get no clue from their statement as to where the bad work was, but there was an article written by General Boynton, that appeared in the Cincinnati Commercial, which gave me my first clue as to what they knew about where this work was, and upon that I started and made my first holes in the roof of the tunnel. There I found on the first day a cavity in O'Brien's work. I then examined next day O'Brien's work very extensively, and I found all through Champlain avenue west, all that he had done, to be just a series of holes with partitions between. I examined up the haunches through that section, and they appeared to be generally good work. The way I was examining them the drill would enter into solid rock; there was no hole through.

Q. No cavity?—A. No cavity. I then made six or eight cavities in Woodward's work, and I found that solid in the key. I then went to McNamara's work in Rock Creek, and I found there my first drill holes opened up dry packing; it was well backed, but without a bit of mortar over the key at all, though it was placed in very solidly. In opening up the sides I found mortar placed in large masses, and then following that would be a layer of stone laid dry. In his work there seemed to be a sufficient amount of mortar, but it was not distributed properly. They seemed to have used a great deal of mortar, as they would put in dry stone; then they would throw in this mortar, and it would permeate down a little ways, and then you would have a thick mass of mortar left there.

By Mr. McMILLIN:

Q. With no stone in it?—A. No stone in it; just a large chunk of mortar. His work improved, however, as it went along, and the last 100 feet of his work before this was mentioned at all in the papers was good, solid work. Then there came two small pockets in the key with mortar down on the side, and one of those pockets showed me what had taken place. There was a space of about 22 inches wide over this key, and they had started on one side from the partition walls at the close of the preceding bay, and they run their partition wall diagonally like that [illustrating.] That is, they had put in the partition wall and left this space, and I could see that McNamara had been present, and they had just filled in a space, and that he could not notice from where he sat, not very far off; and in under there was a rock bend, and they left this right straight along, and then had suddenly closed it when he had moved, and then there came another pocket. The next one didn't even have that. They had just left a pocket about 3 or 4 feet.

Q. With nothing in it at all?—A. Nothing at all in it; but the work did not appear to be so fraudulent as O'Brien's. There was no attempt in the work which O'Brien had done to make good work of it.

By the CHAIRMAN:

Q. About how much linear space was there to O'Brien's work?—A. The key of O'Brien's work and a slight portion of the arch were constructed for a distance of about 750 feet in Champlain avenue. The sides throughout all this portion were constructed by Woodward and Lucas. I then inspected——

Q. Right there, before you go on; how long would it have taken to complete that 750 feet?—A. From June to August I should say.

Q. Two months?—A. A little over two months.

Q. You were going to say you then inspected; you then inspected what?—A. I then inspected Rouzee's work in Foundry Branch, and that I found solid. There was cement mixed with stone in every place I cut open and examined; but in two places there was not what I considered enough cement to have made a good rubble wall; however, it was a great improvement over any of the others except Woodward's work. At that time his work was very good. I made two drill holes in Masters's work. He had about 200 feet there. I found back of this place that had been discovered some more holes in his work.

By Mr. McMILLIN:

Q. Defective work?—A. Defective work. That was all that I had been directed to examine. I then stopped the examination of the work for this year.

Q. Has any examination up to this time been made concerning the work prior to this year?—A. Mr. Sparrow is making an examination of the work through the entire lining of the tunnel.

By Mr. RYAN:

Q. By what process?—A. He is sounding it with a sounding-rod, and by the tones given out he determines whether it is solidly backed, or whether there is dry packing, or whether there is a cavity; and he pretends to be able to tell the size of the cavity by it.

By Mr. FAULKNER:

Q. He is acting under our board of experts?—A. Yes, sir.

By Mr. RYAN:

Q. I suppose he is acting under the board that we organized?—A. Yes, sir.

Q. How long was that work of O'Brien's in progress of construction?—A. Two months. That was the work in Champlain avenue. He was employed in all a little over three months.

Q. Were any of the engineer officers—yourself or Major Lydecker—passing over that work from time to time at all?

The WITNESS. At the time it was being done?

Mr. RYAN. Yes.

The WITNESS. No, sir; not in Champlain avenue. I was in Howard avenue shaft.

Q. I mean the O'Brien work?—A. O'Brien worked a short time in Howard University as well as Champlain avenue.

Q. During the construction of that work neither yourself nor Major Lydecker, nor any of the engineer officers were in there?—A. We were not in Champlain avenue. We were in, but not while he was at work.

Q. How does it happen that none of the engineer officers passed through important work of that kind, covering a period of two months?—A. I passed into it almost daily in the day-time, but I had selected this man, and I supposed I could particularly trust him with this work, and I did not think it necessary to go there at night.

Q. If you passed through it in the day-time could you not discover defective work that was put in in the night?—A. No, sir; the defective work I saw in the day-time was the finished walls which covered up all the cavities behind them.

By Mr. FAULKNER:

Q. Did you state on whose recommendation Mr. O'Brien was selected?—A. I did not; but he was selected on the recommendation of

Mr. Kirlin. At the time that O'Brien was appointed it became necessary to do some night work in this heading, and I will state here that that has been a class of work that I did not believe in to any extent, and it was only done because of the clause in the last appropriation bill requiring that work to be finished by the 1st of November. The object of doing night work in that heading was to bring that heading up to the state of the other headings. When this piece of bad work done by him was discovered, to which I have alluded, all night work was stopped within three or four days afterwards.

Q. Then you think that this defective work you speak of was mostly done at night?—A. That portion was done at night, but his work that was done during the day seems to be about as bad, so far as I can see.

By Mr. McMillin:

Q. What was to prevent them from doing as good work in the night as in the day, in view of the fact that it was all done in the darkness?—A. Nothing.

Q. You spoke a while ago of finding the work in July dry; was that brick-work as well as the packing?—A. No, sir; that was simply the packing. I never in any of my investigations found bad brick-work.

By Mr. Ryan:

Q. You were through that work several times in the day-time, were you not?—A. Yes, sir.

Q. And the work done in the day-time, as well as that done in the night-time, seems to be bad, does it not?—A. It appears to be bad.

Q. How do you account for the fact that you did not discover it yourself from personal observation, you having passed through there so frequently in the day-time?—A. I would find, when I went in there, work laid with a coating of cement over these stones. I can account for it on the testimony that I have listened to before the court of inquiry. At the time I thought all this work was good, and I thought everything was being done properly. But there have been witnesses before that court who testified as to the way in which it was done.

Q. You can account for it in your own way. State how they accomplished this fraud under such circumstances without you being able to observe it?—A. As all the inspectors and contractors, leading men, carried a light that was a little larger than those carried by the other men, that light could be seen a short distance in the tunnel, and when any inspector was seen by them with one of these lights, when they were doing this bad work, they had a bucket of mortar at those places by their side, and covered up the bad work, and by the time I arrived it would be completely covered with cement, and they would be putting on separate and individual stones over the top of it solidly in cement.

Q. So as to present the appearance to the naked eye of good work?—A. Of good, solid work.

By Mr. Faulkner:

Q. That could not go on except by collusion between the workmen and inspector, provided the inspector was performing his duty, could it?—A. It could not. And here I would like to say, in regard to inspectors, that this year I recommended the doubling of inspectors, having two inspectors in each shaft. It would seem that last year there was ease of fraud in this tunnel. I did not think at the time that fraud was being committed, but when this work was resumed I recommended to Major Lydecker, and my recommendation was carried out, to have two inspectors, and that they should not be allowed to leave the scaf-

fold except for such necessary work as seeing that the necessary centers were properly placed, that the brick-work should be constructed; but he should have been present there practically at all times.

Q. If you find a number of these cavities of 2 or 3 feet in area, how will they be filled if the tunnel is completed according to the original specifications?—A. I do not exactly understand.

Q. I say if you find these cavities in the packing, how would you complete that tunnel according to the original specifications, with reference to the packing? Would it be by cutting the key of the arch and taking it down, or how?—A. If the spaces are large, as they were in O'Brien's work, a space can be cut in the key of the arch and the space above packed solidly, and then another hole cut a little further on. Where there is room that can be continued right along, just knocking out these partitions, and that work could be carried over quite a distance of O'Brien's work. Where the rock comes very close to the arch, then it would have to be filled in around this hole in all directions. Then when you come to the hole fill it up as far as possible, and then my idea would be to just force in cement and mortar right into that space that is necessarily left—bring it up as close as possible, and fill it up with cement with a pumping machine.

Q. In your judgment, as an expert, that is essential in order to carry out the original plan of the tunnel as to the packing and to make it safe as a permanent improvement, is it not?—A. No, sir. Through some of those sections I think dry packing, properly placed, with spaces left so that the water could permeate around up above there, would be a safe construction. The portion that was lined, where this worst work of O'Brien's is, is in rock which has been considered the best in the tunnel, and the lining was placed in this particular part merely as a precautionary measure. If the tunnel had been built at grade instead of being under such tremendous pressure that lining would not have been so placed; the risk would have been run; but the idea of putting in this light lining has been to make absolutely safe sections of the tunnel which were already considered safe, according to the probabilities, but at the same time it was considered advisable to run no risk of repairs. It is going to be a very difficult matter to repair that tunnel. If dry packing had been used in those sections I do not think there would have been much leakage, and if the rock should happen to crack and commence to fall, I think the arch would support it. So that for that section I think dry packing could have been used.

Q. But to resist the pressure from the interior you think it would be necessary to have either a concrete or dry packing?—A. Concrete or dry packing; and not only that, but I should make holes from place to place in the arch, so that the water could get out between the places and fill the stone. This pressure is from 50 to 60 pounds to the inch, and there would be no stone-work which would stand that without the most solid backing behind it; but a water backing in these sections where there is not very much danger of leakage or water escaping, I think, would be safe. These sections are pretty dry there. I do not think there would be very much flowing out from these particular sections. There are other parts where I do not think the dry packing would do at all.

By Mr. McMILLIN:

Q. There are some parts of O'Brien's work where there is no dry packing at all?—A. Yes, sir.

Q. If you cut holes in the tunnel, through which the water can es-

cape, that would necessarily supply all the avenues that lead out from the tunnel with that pressure?—A. This tunnel in that particular part runs through very solid rock. I do not believe it would find avenues of escape through 50 feet of rubble.

Q. When did you first ascertain that the original contractors had sublet this work?—A. I never definitely ascertained it until the investigation began.

Q. Did you suspect it from the way the work was going on?—A. Well, I looked upon the subcontractor more in the nature of a foreman than a subcontractor. I do not know what their arrangement was in regard to the matter. I had been informed that he was receiving $5 a day.

Q. You were informed by him?—A. No; I was informed by casual accident.

Q. It was true that he was receiving $5 a day?—A. I was so told, but at the same time I knew that there was some arrangement more than that with him.

Q. Were Beckwith & Quackenbush about there much?—A. Quackenbush was on the surface a good deal, but I never saw him down in the tunnel.

Q. While you were going through the tunnel was it your habit to go up on the scaffold and look at the work?—A. Yes, sir, sometimes I would get up on the side wall where I could see it, but I made a point of looking at the masonry.

By Mr. RYAN:

Q. When did you graduate?—A. In 1879.

Q. What duties have you been performing since then?—A. I was stationed at Willets Point for two years at the school of application there, which is practically a post-graduate course from West Point; from there I went to Petersburgh, Va., and was employed as assistant upon improving the Appomattox River; I went from there to Baltimore, and was employed for a short time on the different rivers through that section of country from Baltimore Harbor to Wilmington, as assisstant to Col. Craighill; I was then appointed as assistant to the Engineer Commissioner of the District of Columbia, and served in that capacity for two years; then I was appointed regimental quartermaster at Willets Point and commissary of the post, and introduced the water supply there; I was then relieved from that duty and reported for duty to Major Lydecker.

Q. What experience have you had in this sort of work besides this?—A. I had for two years been building sewers here in the city, which were built under that large appropriation of $500,000, made a few years ago, if you remember.

Q. Boundary sewer?—A. Boundary sewer; I supervised that. I relieved Captain Hoxie of his duties in the city.

Q. Is that the extent of your experience in this kind of work?—A. I had experience in masonry work on the Kanawha River for a short time; I was there for several months.

Q. That includes your whole experience?—A. Yes, sir.

TESTIMONY OF ELIAS H. KIRLIN.

TUESDAY, *November* 27, 1888.

ELIAS H. KIRLIN sworn and examined.

By the CHAIRMAN:

Q. Where do you reside?—A. In Washington.

Q. What is your age?—A. Fifty-nine, nearly.

Q. What is your occupation?—A. Principal inspector of the Washington Aqueduct tunnel.

Q. How long have you been employed in that business?—A. Since November 15, 1886.

Q. What was your occupation before that time?—A. I was inspector of masonry on the Great Kanawha River, under Colonel Craighill, for nearly eleven years.

Q. Are yon a practical mason?—A. A practical mason, yes, sir; I served my time as a builder. I have made masonry a special business since 1857. I have my orders here, Senator, if you wish to look at those.

Q. You may state under what orders you have been acting as supervising inspector.—A. Under the orders of Major Lydecker and Lieutenant Townsend.

The witness produced two orders, dated, respectively, November 15 and December 15, 1886, which were read by the chairman, as follows:

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., November 15, 1886.

SIR: You are hereby appointed principal inspector of the work of lining that is to be done in that section of the Washington Aqueduct tunnel, extending westward from the bottom of the Champlain avenue shaft to the western end of the tunnel. In order to prepare yourself for this duty you will at the earliest opportunity arrange for, and make, a careful inspection of that section in connection with Mr. G. H. Coryell, assistant engineer, who will be instructed to point out to you the parts that have already been selected as require lining, and which are included in the estimated cost of the work on which the last appropriation was based.

Your compensation will be $175 per month, commencing from this date.

Very respectfully,

G. J. LYDECKER,
Major of Engineers, U. S. Army.

Mr. E. H. KIRLIN,
Washington, D. C.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., December 15, 1886.

ORDERS.

(1) Mr. T. C. Smead, assistant engineer, is assigned to duty on the aqueduct tunnel, and is charged with the work of measuring, by accurate cross-sections, all that part of the same west of Champlain avenue shaft. He will act under the immediate orders of Mr. George H. Coryell, assistant engineer, and render weekly reports, which shall include detailed drawings showing the cross-sections made and all figured data in relation thereto.

(2) Mr. E. H. Kirlin, supervising inspector of lining on the aforesaid part of the tunnel, will make report of weekly progress concerning the work which has been placed under his immediate supervision, in such detail as to cover all matters of importance relating thereto, together with his recommendations concerning the same. He will see that subinspectors on the work of lining, in that part of the tunnel committed to his supervision, are faithful and competent in the discharge of their duties, and that all orders of the assistant engineer in charge are duly observed.

(3) All reports as above directed will be submitted to and transmitted by Mr. George H. Coryell, who is hereby confirmed as the first assistant engineer and representative of the undersigned in all matters relating to the operations on the tunnel.

He will transmit these reports with his remarks thereon in time to reach this office not later than the Tuesday following the week to which the report relates, including in his letter of transmittal a résumé of the work done, and the recommendations as to its further prosecution. Daily reports concerning operations in the tunnel east of Champlain avenue will be rendered as heretofore, and the supervising inspector of lining west of Champlain avenue will submit daily a report of the force engaged thereon.

G. J. LYDECKER,
Major of Engineers, U. S. Army.

Copy for information of Mr. E. H. Kirlin, supervising inspector of lining.

Q. When did you commence under this appointment of the 15th of November?—A. I commenced on the 16th of November, 1886. Mr. Coryell visited the tunnel with me that day at Champlain avenue.

Q. Who at that time had supervising and inspecting charge of the work east of Champlain avenue shaft?—A. A man named Tarbell.

Q. Did you at any time succeed Tarbell or come to be superintending inspector east of Champlain avenue?—A. Yes, sir; I did. Tarbell left soon after I went in the tunnel in 1886; I think he was there only two or three months after I went there, and a man named Harper, I think, succeeded him.

Q. When did you come to be supervisor east of Champlain avenue?—A. In 1887.

Q. What time?—A. I was 800 feet in Champlain avenue in September, 1887.

Q. When you began east of Champlain avenue shaft to supervise the inspectors, etc., had any lining been done in that part?—A. Yes, sir.

Q. How much?—A. About 3,300 to 3,500 feet.

Q. All in one place?—A. No; there were two places I filled in. I built from shaft station 318 and from 748 to 948, about 918 feet.

Q. You say you built?—A. Yes, sir; I supervised the building of it; that was in Howard; the length of that is 3,317 feet, the entire length of the heading.

Q. How much of the lining was in when you began to have the superintendence of the eastern section?—A. About 2,800 feet; that is all Howard heading; and in the eastern end of Champlain avenue there was about 430 feet, I think.

Q. Those two together were all done before you had supervision of that part of the work?—A. Yes, sir.

Q. Who was supervisor when that part of the work was done?

The WITNESS. The inspector, you speak of?

The CHAIRMAN. Yes.

The WITNESS. Mr. Coryell had immediate charge of the work; there were different inspectors; I did not see them all; there was a man named Chadwell, and one named Tarbell, and one named Woodward, and another named Hutton, and then there was Harper; I think those were the inspectors.

Q. Was that lining which existed when you took charge east dry packed?—A. No, sir; it should have been laid in mortar, but I am sorry to say some of it was dry packed. It was under orders to be laid in mortar.

Q. It was put in after the dry-packing theory had been abandoned?—A. Yes, sir; I placed in the stone side-walls and brick arch.

Q. That is, as supervisor you overlooked that?—A. Yes, sir.

Q. All that work was done before you had charge?—A. No; 518 feet was done while I was in charge.

Q. How many persons did you have under your direction as subinspectors?—A. Last year I had five; this year I had from ten to twelve.

There was more work at different points this year than there was the year previous.

Q. Who selected those for 1887?—A. They were selected and appointed from the office.

Q. Did you have anything to do with their selection?—A. No, sir.

Q. You made no recommendation?—A. No, sir; not in 1887.

Q. How was it in 1888?—A. In 1888 I recommended the appointment of two, Mr. Briggs, assistant in the west end, and Mr. O'Brien, the inspector at Champlain, on the night force, and the inspector in Howard.

Q. O'Brien was inspector at both those places?—A. At different times; in part he was on the night force.

Q. How did you learn about O'Brien? How came you to recommend him?—A. I knew him to have been engaged on the reservoir as foreman there, and I looked upon him as an upright, honorable man.

Q. You mean the new reservoir?—A. Yes, sir.

Q. Did anybody recommend him to you?—A. No, sir; I knew him about a year, I guess.

Q. Who first spoke to you on the subject of his being selected—you or he?—A. I recommended him to the office; I asked the office to appoint him.

Q. Had you had any conversation with him at that time upon the subject?—A. Yes, sir.

Q. How did the conversation originate? Did he come to see you?—A. No, sir; I do not remember now whether he came to see me, or I met him down town; I sent word for him that I would like to have him come on, and he said he would like to do so. I looked upon him as one of the best inspectors and most intelligent men we had.

Q. So that, if I understand you, it was entirely on your own motion that he was selected?—A. Yes, sir.

Q. Without the influence of any other consideration?—A. Without any other influence at all.

Q. What is O'Brien's first name?—A. Thomas.

Q. What is his address?—A. That I could not give you.

Q. Does he live in this city?—A. He lives on Lincoln street, near the reservoir, on the west side of the reservoir, in one of the Government houses there.

Q. You mean the distributing reservoir?—A. The new reservoir.

Q. When you selected O'Brien, what did you know in regard to how he had performed his duty as inspector on the reservoir?—A. Well, I don't know that I had any particular information except hearing different men speak of him as being a good foreman.

Q. He was foreman there?—A. He was foreman there.

Q. He was acting under the contractor?—A. Under the contractor; I think he was there four years ago. I laid a large pipe line on New Jersey avenue up to the reservoir, and I think he was there then; I used to meet a number of the foremen and inspectors when I got up near the reservoir with that work.

Q. Who were the contractors under whom he was working?—A. Petersen was the last contractor. The contract was let to Maloney & Gleason or to Gleason & Maloney (I don't remember which the name of the firm was). It went by the name of Maloney, and Maloney had to sign all the checks; there was no change in the contract, only an agreement between them and Petersen, as I understood it.

Q. And then the contract was taken away from them?—A. I think the engineers got into a difficulty with Gleason, and then this man Pe-

tersen was put on; I don't know why or how; I had nothing to do with the reservoir.

Q. And Petersen was the person who employed O'Brien, as I understand?—A. I think so.

Q. What time did O'Brien come on to work under you?—A. June 7, 1888.

Q. What were the particular duties which O'Brien and all the other inspectors who were under you were to perform?—A. To see that the work was properly performed, that the specifications were properly carried out, both in laying side walls and arches, to see that the brick was properly laid, and that the packing was properly placed.

Q. Did they have copies of the specifications?—A. No, sir; I read the specifications to O'Brien.

Q. Why did you not give him a copy?—A. I don't know that I had time at that time to make a copy.

Q. Did the other inspectors have copies of the specifications?—A. My assistant had a copy, and he read it to all the inspectors in the western part of the tunnel.

Q. Who was your inspector?—A. Mr. Briggs was this year—1888—that is, from Rock Creek west.

Q. Did you have any other assistants?—A. No, sir.

Q. Your duties were laid down in your letter of appointment?—A. My duties in 1886 and 1887 were to go from Champlain avenue to the west and back, to instruct the inspectors, to attend to the grade, measure up the linear feet of brick-work per day, and the linear feet of masonry placed in per day, and the amount of muck removed (that is, the rock that was blasted down), to make daily reports upon that and enter it upon the record book. This year, every other day, while working in Howard, I would make the round trip, which is nearly 8 miles. Every second day I would go from Champlain avenue to Howard, and west to Rock Creek, so that I was in Foundry Branch generally only every other day; sometimes I would be detained and would not get in; one day I was unwell, and probably two days I did not get in on that account; then one day I was away, when I was paying the men; it was my duty to go to the office and get the checks and pay the men; I would have them come up outside and sign the pay-roll, and after I had paid them I would return the pay-roll to the office.

Q. When did it first occur, that you heard of in any way, or discovered yourself, any imperfection in regard to the lining of the tunnel?—A. The first bad work I discovered was the 15th of January, 1887. On the 12th of January we commenced work in Rock Creek east with Mr. Woodward as inspector. I was absent on the 12th and 13th, in Baltimore. On the 14th I was in, and on the morning of the 15th I went in early. I was up at that part of the work at 7.40 o'clock in the morning. Then we were working a night force only, not a day force; and Mr. Woodward had got permission to place in some packing, from the top well down about 18 inches or two feet, in his absence, so that they might put up the centering for the night-work in building centers. I came in unexpectedly upon them and heard them crying for mortar, and I increased my pace, and I got there before they had covered it up; it was bricked over, and they had intended to have it all covered up before I got there, but I discovered it in time, and had it torn out.

Q. Where was Woodward at that moment of time?—A. He had been on night duty, and he had given them permission to do this in the daytime.

Q. Who was the foreman in charge of that gang doing that?

The WITNESS. The foreman of masons?

The CHAIRMAN. Yes.

The WITNESS. I don't remember his name; he was an Irishman named McNamara or something like that.

Q. Was he there then?—A. No, sir; it was a packer that was doing this work.

Q. Was there nobody in charge of that gang of men?—A. No, sir; only one single man doing the work, and a man making mortar; it was a packer doing this work.

Q. Nobody else there doing anything at all?—A. No, sir; they remained from the night force to do this particular piece of work. When they were done I presume they intended going out for the day.

Q. What did you do when you discovered that?—A. I discharged the man and sent for Mr. Woodward, and he had it torn out and replaced properly.

Q. Was the man actually discharged?—A. Yes, sir.

Q. Did he ever go back on the work any more on any part of the tunnel?—A. No, sir.

Q. Do you know who the helper was who was passing up mortar, etc., to him?—A. No, sir; I don't.

Q. Did you report that circumstance?—A. I did, to Mr. Coryell.

Q. Did you report it in writing or verbally?—A. Verbally, I think. He ordered Mr. Woodward never to go off or allow any work to be done in his absence, and never to allow any work to be done after the hour of his going away, and I gave the same instructions.

Q. How extensive was that fraudulent piece of work?—A. Thirty-one feet long and about 2 feet deep.

Q. How wide?—A. I don't remember the width; from the back of the wall to the rock it varied probably from 9 feet to 1½ feet. I haven't the cross-section for that, or I could state exactly.

Q. How much work had to be taken down in order to pack that properly?—A. None of the brick-work, simply the dry stone behind the wall.

Q. Was the arch turned clear over?—A. Oh, no; it was on the side wall.

Q. When was the next time after that that you heard or knew of anything wrong?—A. The next time was the 28th of March, 1887.

Q. Tell us what occurred then.—A. I found in Champlain avenue west, in charge of Mr. Lucas as inspector, a place of 10 to 12 feet long and 2 to 3 feet wide and about 18 inches deep.

Q. How did you find that?—A. I came onto them from the west, and simply saw them putting it in there.

Q. Was Lucas there?—A. Lucas was forward, placing concrete in the bottom. He might have been there long enough for them to do it, but if he had been attending to his duty he would have seen that it was not put in. I had that removed and the men discharged.

Q. Do you know the name of the man who was doing it?—A. No, sir, I don't. Thomas Terrell was foreman of the brick masons.

Q. Was the foreman discharged?—A. No, sir; he claimed to have no jurisdiction over the packers; I called the attention of the subcontractor to it, and he said that he would give him jurisdiction. I told him that he would have to remove him unless he did, or else have a foreman there. After that it was understood that Terrell had charge of the and brick packing both.

Q. Who was the subcontractor to whom you called attention about it?—A. I say "subcontractor," and the term "subcontractor" was

spoken of. I don't know that you can determine that they were subcontractors, but the parties were Brennan and Emory.

Q. Who was Emory?—A. Emory was Brennan's partner.

Q. What was the nature of their relation to the work, as you understood it?—A. Something in the nature of a commission, I would take it. The contractors, Beckwith & Quackenbush, paid them each $5 a day for their services; then Beckwith & Quackenbush paid Emory Brennan's men just the same as they paid their own men. Beckwith & Quackenbush's paymaster would be there every week and pay Emory & Brennan's men the same as their own, and Beckwith & Quackenbush's time-keeper kept the time of Emory & Brennan's men. I think also that Beckwith & Quackenbush furnished Emory & Brennan their mules and their tools; in short, everything was secured to them and furnished to them, and then they were paid $5 a day by Beckwith & Quackenbush. Their work was measured as it progressed, and at the end of the month a calculation was made of the number of yards that had been worked at a given price per yard, and the expense charged up against them. For example, if the expenses were $1,000 a month, and the measurement came to $1,200, there was $200 paid to them. That is the way I understood the contract was.

Q. But do you understand what the percentage of their commission was; what did they get beside their $5 a day?—A. They got $1.25 for packing, $1.25 for concreting per cubic yard, and $2.75 per yard for brick-work. If they laid a sufficient number of yards to pay $200 or $300 more than the expense of the work, that the contractors had to pay to those men; that amount went to them as I understood.

Q. They got a stipulated sum from Beckwith & Quackenbush, and that would be measured by so much per yard after deducting the expense of paying the men, etc.?—A. Yes, sir; and paying them $5 a day. But if there had been any loss, of course the contractors would have had to stand that, as Emory & Brennan I understood had nothing. That is the way I looked at it.

Q. What did you understand were the prices that these subcontractors, as you call them, got for doing the work?—A. They told me themselves.

Q. Those prices were much less than Beckwith & Quackenbush were getting from the Government?—A. The prices that Beckwith & Quackenbush got covered the materials.

By Mr. RYAN:

Q. This contract you are talking about simply covered their labor?—A. The labor of the brick-masons and laborers.

By the CHAIRMAN:

Q. Was it Brennan or Emory that you spoke to in regard to the defect that you have last mentioned?—A. Emory.

Q. Do you know his first name?—A. I do not. I understand he is in a hospital in Massachusetts somewhere suffering with cancer of the rectum.

Q. Then he is not within reach of a subpœna from this committee?—A. They have tried to reach him from the court of inquiry, and that was the reply.

Q. Where is Brennan?—A. Brennan is in New York somewhere. They don't seem to reach him either.

Q. What is his first name?—A. Thomas, I think.

Q. Has he been about here recently; that is, within six months?—A.

Yes, sir; he has been here up to the 1st of October, I think, probably the middle of October.

Q. Up to the time the work stopped, in fact?—A. Yes, sir; and a week or more after.

Q. Still having connection with the tunnel?—A. Yes, sir.

Q. Did Emory continue to have connection with it down to the end?—A. No, sir; his health was such that he couldn't come here. Last spring a man named Palmer was taken in with Mr. Brennan, and in 1888 it was Brennan & Palmer.

Q. What is Palmer's first name?—A. John.

Q. Where does he live?—A. I think his number is 2810 High street, Georgetown.

Q. You have described the size of that place. Now you may go to the next instance of bad work that ever came to your knowledge in any way?—A. The next thing of any amount——

Q. You need not mind whether it was any amount or not; the next of any kind?—A. We would find places where there merely wasn't a sufficient quantity of mortar, but there was very little note made of it.

Q. Who would find them?—A. If I would go on the work I would find anything of that kind—two or three stones laid without mortar probably. I would always have them removed, and that would be done in the absence of the inspector.

Q. How would it happen that the inspector would be absent?—A. The inspector might be on one end of the second length of the center. Our center is 14 feet long. He might be back over there and the bricklayers between, and it was necessary for him to pass back and forth pretty often to see all the stone laid. The packer might place in three or four stones during his absence, but no large space could be covered without his seeing it if he was attending to his business. In June of this year——

Q. Is that the next instance of what you consider of any consequence?—A. Yes, sir. On the 23d of June, 1888, with Mr. O'Brien as inspector, I ordered him to go to Rock Creek west and place in some work, and also to finish some in Champlain avenue east, but not to return to Champlain avenue east until he was through with Rock Creek west; not to allow the masons to come back to Champlain avenue east. But it appears that after getting the brick placed in Rock Creek west he left the packers there and came back to Champlain. My assistant on the work thought there was more work done than there should have been in that time, and tore it out and found 14 feet over the arch from 2 to 2½ feet high. I sent for Mr. O'Brien and had him come over and look at the work; I also sent for Lieutenant Townsend to meet me at my office in Champlain avenue. Mr. O'Brien claimed that it was a misunderstanding of the order; he thought that he was ordered to go to Champlain avenue when he got through a certain amount of work at the other place. I reprimanded him, and left him with the understanding that if anything of the kind occurred again he would be discharged.

Q. Who was the foreman of the gang that did that night work that was found to be fraudulent?—A. I don't know that I could say. I think a man by the name of Martin, but still I am not positive.

Q. Did you cause him to be discharged?—A. No, sir; he was not foreman in the upper work; he was foreman of laborers below.

Q. Who was the foreman of the work that should have been done?—A. It was one of the Kendall Brothers, brick masons. We considered that they had charge of the work on the scaffold.

Q. Did you require the discharge of the person that you understood

was responsible for that performance?—A. No, sir; because of the misunderstanding of orders. He was brought over to Champlain by this misunderstanding of orders.

Q. Who was brought over?—A. O'Brien.

Q. Who was left there that committed that fraud?—A. Nobody but some of the packers.

Q. Who were the packers?—A. I think the name of one was Jones; the other I don't remember. They were both discharged.

Q. Nobody was in charge of them?—A. Nobody in charge.

Q. How were they paid; by the day?—A. Yes, sir.

Q. What could have been their motive for this bad work?—A. No other than to get the work done and get away, I presume; that was the only thing I could see; pure laziness.

Q. Supposing one of these people that you call subinspectors had wanted to get a good deal of work apparently done, and yet not really done, would it not have been a matter of interest to him to induce those packers to commit that fraud?—A. It would; but I have repeatedly heard Mr. Palmer say to the men that he wanted the work done well; I have also heard Mr. Quackenbush say the same. He has said to me, "Mr. Kirlin, I get enough of that work to do and want it done well;" more especially as he had done work well, and he didn't want any more bad work.

Q. Supposing I had been Mr. Kendall, or had been a packer, and that it had been agreed between me and the subcontractor that I was to have $2 a linear foot, for instance, of every extension of the lining that should take place, if it was done at a certain rate of rapidity, with the understanding that no matter how it was done so it would get by the Government inspectors I would be paid for it, would it not be perfectly consistent with that for me, in your presence as the Government inspector, to tell those very same men, "Now, I want you to be sure that this work is done fairly; you must be absolutely virtuous?" Would not that be the very thing that a corrupting contractor would say in the presence of a Government inspector?—A. Well, he might possibly if he was disposed to be dishonest. I will say this, if you will allow me: I have done a good deal of tunneling before I came here, and I always had more trouble in watching the workmen than I had in watching the engineers, and that was before the war, when men were thought to be more honest than they are now; but even then I had more trouble with the men than anybody else, when there was no motive at all for doing bad work except to get the work done quickly and get it out of the way, apparently.

Q. Where was this tunneling that you speak of?—A. On the Chesapeake and Ohio road; it was then the Covington and Ohio road.

Q. That was an open tunnel in rock, I suppose?—A. Oh, no; it was a railroad tunnel.

Q. That is what I mean; a tunnel through rock, was it not?—A. A tunnel through rock.

Q. And it was built to withstand pressure from the outside.—A. The pressure of falling rock. The rock decomposed after it was cut through.

Q. And you built a lining?—A. We built a lining throughout as far as we could until the commencement of the war. Here is a letter from the engineer in charge.

Q. I do not care about that. Having had this experience with men sligthing their work, with no motive, as you suppose, do you mean that you think that all this thing, as it is said to have turned out to be now, could

have happened from that cause?—A. It was caused, in my opinion, by the carelessness of the inspector and the laziness of the men.

Q. I am now talking about the men entirely. You think that all this failure to build that lining properly arose from the mere circumstance that the men were lazy and careless?—A. Yes; I don't think there was any other motive but that.

Q. Did you ever discover in your previous experience that you have had, in tunnel building, etc., that your employés had been lazy and careless?—A. Yes, sir.

Q. How did you find it out?—A. By watching the work closely to see if they would take advantage of my absence.

Q. Did you ever have any experience which was so extensive as this present experience of yours?—A. No, sir.

Q. Where a mile or two or three of a tunnel lining has turned out to be, three-fourths of it, from rod to rod and from foot to foot, a fraud?—A. No, sir; my duties have always been in small compass. On the Kanawha, with Colonel Craighill, my work was within 500 feet of my office, and covering a space of 500 or 600 feet.

Q. This was your first experience, then, with a great number of men being so systematically careless and lazy?—A. Yes, sir; and the first time I have been obliged to walk over so much work. My walk was from 5 to 8 miles under ground per day, and my orders to the inspectors were always of the most rigid character. While I could only remain a few moments at each place, I would look over the work, and generally get up on the scaffold.

Q. Were those inspectors who were under you required to make reports of daily progress?—A. No, sir; only the assistant during last year; when I didn't get over the western part every day he would make his report.

Q. Did the subinspectors make no report to anybody?—A. No, sir.

Q. Did any one of these subinspectors ever report to you, of his own motion, before you found it out or had heard of it, any imperfection of the work?—A. Mr. Lucas reported to me this year that he thought O'Brien was doing bad work; that was in Champlain avenue east, on the night work.

Q. That was not my question. My question is whether any one of these subinspectors, in regard to the work under his immediate charge, ever reported to you at any time, of his own motion, before you had heard of it in any other way, any imperfection in the carrying on of that lining work.—A. No, sir, none, only this man I speak of.

Q. What man was that?—A. Lucas.

Q. My question is whether any one of these subinspectors ever reported any imperfection to you in regard to the work over which he had immediate charge before you had heard of it from any other source?—A. No, sir; not to my recollection or knowledge.

Q. So that everything which has come to your knowledge did not come from any one of the subinspectors speaking of what he himself had inspected?—A. No, sir; it was my own examination and discovery.

Q. And yet you say it frequently happened that you, in taking these long walks, which you took as often as you could, discovered defects which you caused to be remedied?—A. Yes, sir; frequently. I will say also, if you will allow me, that I can take witnesses and inspect it, and I defy a man to do work of that kind and get as much as three centers ahead without me discovering it. A man has got to go up and down; you can't get along by just simply going under the scaffold in each center. I furnished each one a short ladder so that he could get up and

down rapidly, and that is hard work. I have always advised the men against sitting down to chat and let the work go on wrong.

Q. Until these disclosures took place were you satisfied with your force of subinspectors?—A. I was not in 1887; I asked Mr. Coryell to give me additional inspectors, more especially in Champlain avenue west. I was placing in side walls at station 87 and covering arch at station 15; one inspector had to walk back and forth that distance, as they were drawing together gradually; but Mr. Coryell remarked that we had inspectors enough; that was his reply. We also had a night inspector, a man by the name of Mr. Masters, whom I didn't consider an active man, sufficiently active for the work, and I wanted a change made. The reply to that was that his was a political appointment, and that he could not make any change.

Q. Who made that reply?—A. Mr. Coryell.

Q. Did you ever call the attention of Major Lydecker to that?—A. I did not. My orders were to report to Mr. Coryell. He was my immediate superior officer.

Q. Aside from that circumstance did you regard the force you had under your charge as competent and sufficient in number?—A. I did that year if we were not doing so much work; as the work progressed they increased the number of inspectors. In 1887 we were building the brick bottom and sides, the invert. In 1888 we built stone side walls, the brick arch, two-ring generally; and the invert work was three-ring; side walls and arch two rings, and bottom. To do that we had inspectors of side walls with each force of masons to inspect the centers.

Q. At each point where the work was going on?—A. Yes, sir. When we first started in Rock Creek east the side walls were built, and then the arch was put on, so that one man could attend to both. But when they were both working together there was an inspector for the side wall and one for the arch. After a while, when they were forcing the arch, we had two inspectors on the arch on a part of the work.

Q. Was that sufficient in point of number in all these respects you speak of?—A. Yes, sir.

Q. The fault was, then, not in your not having a sufficient number of inspectors, but in the manner in which they did their duties?—A. Yes, sir. The first year, 1887, we didn't have enough, and I applied for more inspectors.

Q. How much of this bad work was done that first year?—A. I can't tell, as we haven't sounded.

Q. But I mean as far as you have information?—A. I think you will find bad work in the entire tunnel; that is, in spots, from the commencement.

Q. All along?—A. Yes, sir; I have been through with the Board of Engineers sounding, and we have sounded all through different places, say fifty or more feet in some places, and we haven't found a place where it wasn't hollow. You can tell as plainly as you can to strike a piece of steel against a rock that it is hollow, but to what extent we can't tell until we open. I discovered one hole 35 feet long in the work that was placed in by O'Brien when he had force enough so that he could have done the work well, but he never packed it at all.

Q. Can you tell us at what time that piece of work was done?—A. That was done on the 13th or 14th of June. My record shows the stations from day to day where the work was done, so that I can't tell just what it is and by whom it was laid.

Q. You are taking out that work now?—A. I have just discovered it.

Q. That was done the 13th or 14th of June, which year?—A. This year, under O'Brien; that was night work.

Q. Where was this cavity?—A. Over the arch, over the top; it extended over from the arch over the sides.

Q. How many days were occupied in covering that distance?—A. That was covered in one night; it could have been packed, too; there was a sufficient number of men to pack it.

Q. O'Brien, in that instance, could not have been deceived, then?—A. Why, no, sir. That wouldn't have been the first opening in his work. I understood he told Mr. Palmer that that was the only place that could possibly be opened on his work; that the balance of his work was solid. He claimed that that was done the first night he went in, but we find that kind of work all the way through. We find some of the work perfectly solid. As the gentlemen who are sounding will tell you, if there is a cavity of 4 inches in the stone, the sounding-bar will discover it, but to what extent there is a cavity there we can not tell. We can tell that is not filled with mortar. If there is a cavity of a cubic foot open next to the brick work, we can readily tell by the sounding-bar that there is a cavity there.

Q. The last particular instance you have spoken of about having discovered bad work—I do not mean since the general exposure of the business, but in carrying on the work—was, I think you said, June 23, 1888. What was the next?—A. The next piece of bad work I discovered was on the 27th of June, in Foundry Branch east; that was under Mr. Masters as inspector. That particular morning, in place of going through from Champlain, as I usually did, I went over on Foundry Branch first. They didn't suppose I would be there until later in the day, but I got on to them sooner than they expected, and discovered the bad work. They were preparing to key to the west, and on this side there was a space of 8 feet packed perfectly dry; possibly 2 cubic yards that would have been covered in a little while by passing in the key, which could have been done before I had got there if I had gone as I had usually done. It was a mere accident that I got on to that.

Q. Did you find Masters there?—A. He was down on the end of the center.

Q. What was he doing?—A. I couldn't say. I called for him, and got my ladder and got right up to the work.

Q. Was there something down there where he was that required his inspection?—A. The brick mason was working below, but when Masters came up he had nothing to say except, "I can't handle those men and shall quit." That was all I could get out of him. I discharged the brick mason and both packers.

Q. Who was the foreman?—A. Terrell was the foreman; Mr. Brennan was there in charge of that particular end of the work.

Q. Was Brennan there at that time?—A. He was on top at the shaft; he was attending to sending in material, and Terrell was foreman inside.

Q. So that Brennan was not on the spot where this particular fraud was committed?—A. No, sir.

Q. Did you communicate to Brennan the knowledge of this bad work?—A. Yes, sir; I went down to the office and had Lieutenant Townsend come over and examine it himself. Then by digging out on the south side we found some 30-odd feet of bad work.

Q. In that same connection?—A. In that same connection.

By Mr. McMillin:

Q. Was that under Masters, too?—A. Yes, sir.

Q. The 30-odd feet?—A. Yes, sir; it was nearly three centers. I opened one center back in the key, and found that solidly packed. Thinking there might be bad work westward, they were working from the east to the west, but we found that in fair condition, but on the south side from the key down we found bad work.

Q. The idea of sounding with a steel bar had not occurred to you down to that time?—A. No, sir; I had every reason to believe that the work was being placed in properly. If there had been a cavity of a cubic foot filled with coin I wouldn't have had no idea where to go and hunt for it. That was my confidence in those people.

Q. You have stated numerous instances where you found bad work?—A. Yes; but still I didn't know of any except what we had found.

Q. But you did not suspect from all these repeated instances of wrong-doing, which occurred either merely accidentally or purposely, that there was any systematic design to do wrong?—A. I did not, sir.

Q. What did you do with Masters at that time?—A. He acquitted himself; he said, "I can't handle those men and I will quit."

Q. Did he depart then and there?—A. Yes, sir.

Q. Whom did you put in his place?—A. A man named Rouzee.

Q. Did he continue to discharge the duties that Masters had discharged?—A. Yes, sir.

Q. How did you find Rouzee?—A. A very faithful and efficient man.

Q. How did you get him?—I think he had applied to Lieutenant Townsend, and the lieutenant had him appointed.

Q. Did you discover any imperfections in the work after he took charge of it?—A. No, sir. We have sounded a portion of his work, and the gentlemen sounding said the places are not filled with mortar as well as they should be.

Q. So that the work that was done under Rouzee is not what it should be?—A. That is what the man sounding says. We haven't made any openings.

Q. I mean according to your information obtained from the man who is sounding with this steel bar?—A. Yes, sir. This sounding he is doing is only with the engineers passing through temporarily. The sounder goes at it systematically, and is sounding Champlain east and will finish Champlain west.

Q. About what length of work was done under Rouzee?—A. This bad work occurred at station 328, Foundry Branch, east. When Masters quit and Rouzee was on that work we went from 328 to 962, I think.

Q. More than 600 feet?—A. And in the west from station 114 to 465; about that.

Q. Three hundred and odd feet more? Is Rouzee in town?—A. Yes, sir; I think his address is 3300 M street, Georgetown.

Q. What is his first name?—A. That I don't remember. I can get the names of those men.

Q. You may tell us the next instance that came to your knowledge in point of time in any way.—A. That was the only instance, except, as I tell you, where Mr. Lucas stated to me that he thought O'Brien was doing too much work at night and not doing it properly. That occurred on the 22d of June, 1888.

Where were you and Lucas when he told you that?—A. In the tunnel.

Q. Lucas was on duty at that time inspecting?—A. Yes, sir.

Q. How did the conversation arise?—A. He had been talking among the men, not to me, and I called him to account for not telling me that he had any suspicion.

Q. Did you hear him talking to the men?—A. No, sir.

Q. How did the conversation begin between you and Lucas on that occasion?—A. I told him I had heard he suspected bad work being done; he said he had; I then reprimanded him for not telling me. This occurred on the 23d of June, I think.

Q. What did he say when you reprimanded him?—A. He said he didn't think cement was going in properly at night, and he felt that the work was not being properly done. I then sent him in on the night of the 23d, while O'Brien was in there. The next morning he reported to me that the packing was done fairly well with mortar. Of course in the morning I could only see the end of the work as it presented itself to me. The following night I sent Mr. Lucas in and kept O'Brien out, to see what the effect would be of that. The next morning I found that the masonry had been placed in about the same condition, so far as I could see. All I could judge by was the appearance it presented to me; of course I didn't dig in to see whether it was good; but after discovering this bad work on the 23d in Rock Creek I recommended to Lieutenant Townsend that we stop this night-work. I may add here that every man in the tunnel was working to his utmost capacity, for the reason that in the appropriation bill we were required to finish by the 1st of November. "November 1st" was painted all over the tunnel. Everybody was forced to his full capacity to get the work done. There would have been no night-work done had it not been for that.

Q. All the frauds were not committed in the night, were they?—A. Mostly; the worst work on the tunnel was night-work.

Q. What were they doing in the day-time?—A. Then they probably had more fear of more men coming in. Lieutenant Townsend would come in every day or two, and I was passing there nearly every day, with very few exceptions.

Q. Did they do as much in distance in the night-time as they did in the day-time?—A. Generally.

Q. Working a greater number of hours?—A. At night they worked longer. Sometimes they worked eleven hours.

Q. Do I understand you to mean that in general—there being alternately a section of night-work and a section of day-work, then another section of night-work and another of day-work, and so on—that the principal faults would be found in those sections done in the night?—A. More in the night than in the day.

Q. Were there any in the day?—A. Yes, sir; I think we discovered some that was done during the day. In this night-work in Champlain avenue that I speak of, where O'Brien was, the masonry was run up to the key during the day, and keyed at night.

Q. What would be the space of that key-work that was left to be done at night?—A. It takes eight courses, or 21 inches; eight courses in the first ring and nine in the second.

Q. Is this instance you have now mentioned, of your going to look at O'Brien's work, the last thing you discovered or heard of until the general exposure took place?—A. Yes, sir.

Q. What was the date of the first information that came to your knowledge respecting bad work that you had not yet discovered?—A. I think it was September 15, the day of the Kendalls publishing that letter. That was the first.

Q. What did you say was the date that Lucas and you had this last conversation; the last instance you refer to?—A. The 23d of June.

Q. Then, from about the 23d of June till the middle of September, a period of almost three months, you discovered no bad work and heard

of none?—A. No, sir. We continued working the night force on Champlain avenue until the night of the 13th of July. The night of the 13th and 14th of July we worked in Howard shaft; then the night force was broken up. It was all day-work after that, but it was in this day-work that the Kendalls claim that there was very bad work. But in sounding it has not proved so. We have found some places where there are cavities, but I do not think to a large extent. Still, we may be able to find them when we make openings. We have made no openings in that portion of the work.

Q. But it has been all day-work since the 14th of July?—A. Yes, sir. The night-work this year was from the 7th of June to the 14th of July.

Q. And since then it has been all day-work?—A. Yes, sir; I say all. We were to stop work on the 1st of November. In Rock Creek west I had some bad work occasionally, and I had to work two nights to get that covered in.

Q. About what was the length of the tunnel, in linear distance, that was lined from the 14th of July until the time you stopped work?—A. That I could't give you without referring to my record book.

Q. Can you not give it to us approximately? Was it 1,000 or 5,000 feet?—A. No; my recollection is that it was station 1181, in Champlain avenue west, where we stopped night-work. We stopped for the season at station 1989. So I think it was from station 1181 to 1989. That would be about 800 feet.

Q. Only 800 feet of lining put in from the 14th of July up till September, when you stopped work?—A. October 26 we stopped work at that point.

Q. I mean all the points along?—A. Oh, no.

Q. I want to have you tell us the whole amount of linear distance of brick-work and lining that was put in—I do not care where it was put in—from the 14th of July, when you stopped work, with the exception you have named, up till the time when work stopped altogether.—A. I couldn't give you that. I could only give you an estimate of two headings, 1,300 feet, and the other work I can't give you for the reason that I have forgotten the stations we were at at that time. But possibly we placed after that time 4,500 feet altogether.

Q. Do you mean to say that you think 4,500 feet, if that was it, taken as a whole, so far as your present information goes, was good?—A. I do, sir; but I find it is not good, when I come to sound it.

Q. You thought it was good, but you find it is not?—A. Yes, sir; I find cavities in it. But I had every reason to believe that it was perfectly solid.

Q. How many places are there where a distinct cavity is exposed?—A. There have been up to Saturday morning last fifty-eight or fifty-nine places where I found some places that were not thoroughly filled with mortar, but well packed, so much so that if we cut from springing line to springing line the packing would remain in there, I presume, strong enough to resist pressure. At other places there were holes varying from 3 feet long to 10; I haven't taken any measurements of them; I simply looked at them.

Q. What is your present information regarding the character of the work that was carried on in the day-time?—A. I have found cavities where it was packed dry, and other places there is mortar; but there are not so many openings in the work done this year. I speak now of the fifty-eight openings that were made in last year's work.

Q. I am not speaking of those at all.—A. I don't remember the num-

ber we have opened in this year's work; possibly ten to fifteen, and maybe more.

Q. In those ten or fifteen of this year's work what was the character?—A. Most of that has been in the night-work, some day-work; we found small cavities in some of the day-work.

Q. You have only spoken of two nights' work since you stopped?—A. I speak of those openings being made in the night-work.

Q. I am speaking entirely of the work which you have said, if I understood you, was done in the day-time.—A. In that there has been very few openings.

Q. And that you say is about 4,500 feet?—A. I should think so; that is one case.

Q. Now, I want you to tell me about that work, and confine yourself to that alone. How much of this work was there that was done in the day-time, since you stopped the night-work in June, and which, according to your present knowledge, was found to be defective, if there was any?—A. Yes, there was quite a good deal, though not so many openings made in that to tell what the general character would be.

Q. You have not inspected it so thoroughly yet?—A. No, sir; not so thoroughly as the other.

Q. As far as you have gone, how many openings have you made in this day-work of which I am now speaking?—A. I couldn't tell exactly; I should think as many as ten or fifteen.

Q. What did you find there?—A. We found some short cavities generally.

Q. How large was the largest one you found?—A. I think the longest one has been the length of two bays. The center is divided into three spaces, making 4 feet 8 inches in each space.

Q. How high?—A. They run sometimes down to 2 inches and sometimes up to 2 feet. This particular work I speak of was about 18 inches high.

Q. And how wide?—A. About 3 feet in width, probably; possibly 4 feet; but it was a small space, and sometimes it ran down to nothing at the ends. I think that is the largest one.

Q. Then this day-work, even so far as you have now re-examined it, turns out to be decidedly imperfect?—A. In many places.

Q. So that, as a whole, it is quite unfitted for the purposes for which it was intended, according to the specifications?—A. Yes, sir. A great deal of it that has been opened will stand pressure, but the mortar is not equally distributed.

Q. Not according to the specifications or anything like it?—A. No, sir.

Q. And other places, as you have stated, where there is nothing at all?—A. No mortar at all.

Q. So that the difference between the imperfection of the night-work and that of the day-work turns out to be only one of degree, as you have now found out, does it not?—A. The night-work is much worse than the day.

Q. They are both bad, only one is worse than the other?—A. Bad in many cases.

Q. What did O'Brien say when you found this bad work of his?—A. The only excuse he made was that that was his first night on. That was the first place opened, and he said that they had taken advantage of him. I asked him how, and he said it might have occurred when he came on top to mix cement or for any other purpose.

Q. Was it his business to go on top to order cement?—A. We had

no foreman for mixing cement, and if the cement came down with more sand than should have been in it——

Q. Was it the business of the Government inspector to mix the cement?—A. No; we should have had an inspector for mixing the cement, but at that time there was none.

Q. That was the first conversation you had with O'Brien on the subject of the imperfect work done under his charge?—A. That was the only conversation I had with him on the subject of the bad work done under his charge. I don't know that I have seen him since but once.

Q. Notwithstanding that, he continued in the service until the end?—A. Oh, no; Lieutenant Townsend relieved him the same day we found that opening; that opening was found in consequence of the information obtained from this letter of the Kendalls.

Q. And this letter of the Kendalls was dated about the middle of September?—A. The 15th, I think.

Q. And how much work was done after that?—A. He remained on a few days after that. Lieutenant Townsend came in and made an examination.

Q. And then did he dismiss him, or transfer him, or what?—A. He dismissed him. I was not there at the time, but O'Brien came to me and told me he was dismissed.

Q. Did you have any conversation with O'Brien on the general subject of this bad work?—A. Nothing more than I told you, in reference to his saying that he was deceived by these Kendalls. I always considered the Kendalls honorable mechanics.

Q. Did you communicate to Mr. O'Brien any suspicion you had in regard to these very extensive pieces of bad work?

The WITNESS. While the work was going on?

Mr. MCMILLIN. Yes.

The WITNESS. I did after Mr. Lucas called my attention to it, and he told me the work was being put in thoroughly.

Q. Did you go and inspect that particular section of the work that Lucas called your attention to?—A. Nothing more than the end of it; that was all.

Q. Did that appear to be good?—A. That was perfectly solid.

Q. Did you ever hear, at any time since you have been connected with the work, of any attempt on the part of anybody to corrupt, or bias, or bribe any of the people employed by the Government there?—A. I have one case.

Q. What was that?—A. That was the case of Mr. Lucas. I heard that he had, after he was discharged, been receiving weekly pay to act as foreman. Mr. Palmer told me that he had understood so. I went to Mr. Brennan and he at first refused to say anything about it. That was after the investigation had been ordered. I think I said to him then, "You may just as well tell me, because this matter will be brought out, and we want to know;" and he told me that Mr. Emory in his absence in New York had been paying him $25 a week; that this man Terrell I spoke of as being foreman of brick-masons and packers was getting that amount, and that Lucas said, "If you will give me that amount I will act as foreman and inspector." He found that was the case, and when he returned he ordered Emory to stop it. That is all I know about that. I never saw him receive any money.

Q. And that you heard of after he was dismissed?—A. Yes, sir; that Mr. Brennan, the partner of Mr. Emory, told me.

Q. Did you ever hear in any way, or know, of any other instance of any proposal or suggestion to influence the action of any person em-

ployed by the Government?—A. No, sir. The inspectors were paid by the subcontractors for after-hours. For example, a bricklayer would get his wall up 2 feet on both sides, and it would be necessary to pack that, in order that he might work the next day, and so the inspector was paid to stay an hour or two hours later in order to get that done.

Q. That is, more than ten hours?—A. More than the nine hours.

Q. Was it a customary thing for the packers to stay after the day's work of the masons was done?—A. Very seldom, sir. This occurred in Champlain avenue more than at any other point. In January I wrote to Mr. Coryell asking the pay of the inspector to be increased from $75 to at least $90 a month, and that the hours should be ten.

Q. That was in January, 1887?—A. January, 1887. My request was disapproved, and a few days later he came into the tunnel and I showed him the necessity of the packers remaining on later than the brick-masons who worked nine hours, and asked him whether there was any objection to their working over-time; he said he didn't see any objection to it if they were not required to stay, but that they would not be required to stay longer than nine hours; and so they did stay. I asked him at the same time whether there was any objection to their receiving pay from the subcontractor for staying; his reply was, "I don't see any objection." They would stay an hour and sometimes two hours, over-time. My recollection is that Lucas worked from that time until the close of the work one hundred and thirty-one hours, from February until September; that is what the time-keeper gave me; I asked him to give me that information. That was the longest hours' work over-time.

Q. What did Lucas get, apparently, for that?—A. Fifty cents an hour. It was an actual necessity that they or some other inspector should stay, and I couldn't get any other inspector, and so they would stay.

Q. It did not occur to you that the Government employés' being paid by the contractor or subcontractor would produce any bias in their minds or lead them to be corrupted?—A. No, sir.

Q. Did O'Brien work over-time, too?—A. He has worked as long as eleven hours, from his report.

Q. Did he get pay from the contractors for his over-time?—A. I think he did.

Q. Do you know at what rate?—A. I heard he had been getting extra pay, and I asked Mr. Palmer on the 12th of October, I think it was, whether he had paid O'Brien, and he said he had paid him $1 a day for night-work.

Q. Besides over-hours for inspection?—A. No; that was over-hours and keeping the time of the men.

Q. Did you know that O'Brien was also receiving money from the contractors?—A. Not until after he was discharged, and then I asked Mr. Palmer that question.

Q. But you did know that Lucas was?—A. Only from hearsay.

Q. You say you wrote to Coryell asking him if there was any objection?—A. Yes, sir. He said he didn't see any objection, and I gave him permission to do so, but I never saw him receive it.

Q. But you knew, as a business fact, that that operation was going on?—A. Yes, sir; I knew that he was getting 50 cents an hour for over-time.

Q. But you say you did not know that O'Brien was getting $1 a day for acting as time-keeper?—A. No, sir; not until after I asked Mr. Palmer if that was the case, and he told me it was.

Q. Did you ever know or hear of any other Government employé, sub-inspectors or anybody else, receiving pay from the contractors or sub-contractors, or anybody other than the Government, for any over-service?—A. Yes, sir; McNamara, in Rock Creek, received some, I think; though that I didn't know until after this investigation commenced up at the court of inquiry.

Q. What did he apparently receive it for—for over-time?—A. For over-time; yes, sir.

Q. Did you ever hear of any others?—A. And Mr. Thomas. I didn't know that he had, but Lieutenant Townsend said in his evidence that he had received, he thought, $5 for over-time.

Q. But you only heard of that in the course of these proceedings at the War Department?—A. Yes, sir. I have no knowledge of any other instance of any kind.

Q. Did anybody ever approach you yourself in any way?—A. No, sir. I say no. When the work was to commence this spring Brennan came to my house and made a proposition to me that I should take hold of the work with him and act as principal inspector. I says, "Mr. Brennan, you have mistaken your man," and he didn't stay in the house a great while. I reported that fact to Mr. Quackenbush, and told him that he mustn't think that I would associate myself in any way there with his subcontractors. That was the only proposition ever made to me.

Q. Did you mention that circumstance to Lieutenant Townsend?—A. I don't think I did.

Q. Did you mention it to Major Lydecker?—A. No, sir; I did not.

Q. Was that the only instance in which any hint or suggestion was made to you?—A. Yes, sir; that was the only instance.

Q. How do you think—with your experience in masonry, and taking into view the nature of this work and the pressure which it must stand from the inside of this reservoir wall—all these defects and imperfections that can possibly be discovered can be best remedied?—A. Well, where we discover a cavity there it is necessary to open and repack solidly with masonry; that is, if it is a cavity of any considerable extent. I should say a cavity of a cubic foot could be very easily distinguished from solidly packed dry work. If these gentlemen that are examining that think that those small cavities in the packing, where it is partly mortared but not full, is an objection, then it is necessary to drill holes into it and force grout in. That, in my opinion, would make it perfectly solid.

Q. That is liquid mortar?—A. Yes, half cement and half mortar.

Q. Supposing there were an absolute imperfection partly filled with stone, which was 20 feet long, 4 feet wide, and 1 foot high, between the top of the brick-work and the rocky surface above or at the side of it; how could you repair an evil of that kind?—A. Say the length of this room, we would open 3 or 4 feet there, or 6 feet; that arch will stand 6 or 8 feet. Open that in and continue opening that and building backwards, the same as the key was put in at the first construction, and pack it solidly. In order to insure the packing to be done solidly clean from the bottom up, leave a hole there where grout can be pumped in, and keep that back until the grout sets just as solid as a bucket of potatoes would be by pouring water in, and every cavity will be filled.

Q. The substance of it, then, is that to remedy these evils as far as they can be it will be necessary to take down a sufficient amount of the lining to reach every part of what needs to be replaced or what needs to be filled up?—A. Yes, sir; and which, I may state, would cost twice

as much as to do it right in the first place. I spoke of getting the material in. We have had very good brick there and the mortar is as hard as the brick. It is very difficult to get the brick cut. Yesterday the superintendent told me he was fourteen hours in Champlain avenue, east, on work that was laid last year, and he said the work was so hard they just had to chip it out piece by piece. They had two men at work, and that was three-ring work.

Q. The men had to work a good deal of the time with the work right over their heads so that it was tiresome work in any case?—A. Yes, sir. The brick masonry shows that the joints are well filled in under the brick. They have had elegant brick.

Q. When you say the joints are well filled, are they really all filled in solidly?—A. Yes, sir.

Q. So that there are no crevices between the bricks at all?—A. No, sir. I have never seen but one instance where the work showed a lack of being full. I could bring you a brick with the mortar on, and you would be surprised to see the condition of it.

Q. When was that brick put in?—A. I think it was taken out of last year's work. The ground mortar is actually as hard as the brick.

By the CHAIRMAN:

Q. You made a special report in July, regarding some defects from time to time, which you have shown us, or which we have read to you here. Did these various instances that you mention all together in that special report appear in your daily reports?—A. Yes, sir; in those daily reports to Lieutenant Townsend.

By Mr. MCMILLIN:

Q. Where do you say O'Brien lives now?—A. He lives on Lincoln street, near the new reservoir; I can't tell you his number.

Q. I thought you stated that he lived in one of the Government buildings there?—A. In one of the Government buildings. When the Government bought the ground there for the reservoir there were some houses upon it, and he lives in one of those houses. It is west of the reservoir. His name is Thomas O'Brien, and he lives on Lincoln street. I presume the directory will show his address.

TESTIMONY OF CAPT. THOMAS W. SYMONS.

WEDNESDAY, *November* 28, 1888.

THOMAS W. SYMONS, captain Engineer Corps, U. S. Army, sworn and examined.

By the CHAIRMAN:

Q. What is your age?—A. Thirty-nine years.

Q. Where do you reside?—A. 1735 De Sales street, Washington, D. C.

Q. How long have you been in the service, captain?—A. I graduated from West Point in 1874.

Q. When were you first connected with matters in the District of Columbia?—A. I was ordered to duty under Major Lydecker, December 15, 1883.

Q. Was that your first experience here?—A. No, sir. I used to be here on duty with the Wheeler survey; I was on that duty for three years, here part of the time.

Q. But your first duty in connection with District matters was under Major Lydecker?—A. Yes, sir.

Q. To what duty were you assigned?—A. I was assigned to him as his assistant on his duty in construction of works for the improvement of the water supply of Washington.

Q. What particular duties were you in fact assigned to? What had you to do from day to day?—A. After I had been there about two weeks he issued an order assigning me to duty as superintending engineer of all the work of construction and of the Washington Aqueduct proper. That included the dam at Great Falls, the fish-ways at Great Falls, the tunnel, the new reservoir, and the laying of the large mains.

Q. In that work was there any other engineer officer than yourself immediately under him?—A. No.

Q. You were then superintending engineer of the whole of this extension business to which we particularly wish to call your attention?—A. Yes, sir.

Q. Was there any civil engineer employed having any control or distribution of matters at that time on this work?—A. Yes, sir; when I went on the work there were two civil engineers employed; one had charge of the work at the reservoir at the eastern end of the tunnel, and the other had charge of the work at Great Falls and the western end of the tunnel, doing such instrumental work as was required, but no work of construction. The work of construction was just starting at that time. Afterwards, when the work was more extended and more work was being carried on, it was necessary to have another engineer, so that we had then an engineer in charge of the reservoir, and the one in charge of the work at the Great Falls, and another engineer was employed on the tunnel.

Q. Who was the other engineer employed on the tunnel?—A. Mr. Coryell.

Q. What time was he first employed?—A. I can't tell you exactly, sir.

Q. About what time?—A. (Consulting memorandum.) It was in October, 1885.

Q. Who were the other two civilian engineers who were employed on the tunnel work before Coryell was employed?—A. Mr. John A. Partridge on the eastern end and Mr. S. B. Merrill on the western end.

Q. What was the state of the actual work when you commenced upon it?—A. The dam at the Great Falls——

Q. No, you need not refer to the dam, but the extension this side of the distributing reservoir.—A. The contractors had had shafts laid out for them, and they had commenced the erection of the houses and the getting together of machinery and hauling coal to the shaft. I think every shaft had been commenced when I took charge as superintending engineer.

Q. How many shafts were there?—A. Five.

Q. Near any of those shafts where experimental borings had been made before?—A. Yes, sir; one at the east end.

Q. Were any of the others?—A. No, sir.

Q. How many experimental borings had been made?—A. There was a shaft sunk at the eastern end of the tunnel large enough to admit a man to go down into it and determine about the character of the rock. Just what other borings were made I can not say; I had nothing to do with that. That is given in one of the reports.

Q. At what time did the first lining work begin?—A. I can not tell you; I think it was somewhere about the middle of 1885.

Q. Were you then still on the work?—A. Yes, sir.

Q. Beginning at the westernmost shaft, do you remember what depth the drawings and specifications called for there?—A. At the western shaft it was contemplated when the contract was let, as I understood it, to sink about 40 feet, just enough to get down and get a fair start with the tunnel.

Q. Were there not drawings, profiles, and specifications showing what was to be done?—A. No, sir; that data had not fully been determined on.

Q. Do you mean to say that there were not in Major Lydecker's office, or in the office of the Chief of Engineers, any drawings, profiles, sketches, or statements of any kind in writing which showed what it was proposed to do?—A. Yes, sir; but only in a general way. There were no drawings and no specifications which fixed the depths at which the different shafts were to go and the exact location of the tunnel in a vertical direction. It was fixed in a horizontal direction, but not in a vertical direction. That was left to be determined by the nature of the rock that we went through in sinking the shaft, and was so determined.

Q. And you understood that at the western shaft the expected depth was about 40 feet?—A. In making the preliminary estimates they estimated that that would be about the depth of that western shaft.

Q. Were those preliminary estimates put on paper?—A. Yes, sir.

Q. Where are those papers?—A. They are in the aqueduct office, I think. Those preliminary estimates were made for the purpose of proving that the money which was appropriated for this tunnel extension, which appropriation was made on estimates for a surface conduit, would do the work of building the conduit in tunnel.

Q. What year was that appropriation?—A. It was made in July, 1882.

Q. And that was made on an estimate for a surface tunnel?—A. Yes, sir.

Q. Where is that original estimate?—A. That estimate was furnished by Captain Hoxie and Major Lydecker to Congress, and I do not think the original of it has ever been found. It was furnished to Congress without going through any of the regular executive branches of the Government, and I understand that that estimate can not be found anywhere. I have never seen it. I have seen some original notes in connection with it.

Q. Where did you see those?—A. At the aqueduct office.

Q. That appropriation was made in what year?—A. I think July, 1882. (Consulting memoranda.) It was dated July 15, 1882. It was a special act; not any District of Columbia appropriation act.

By Mr. CLEMENTS:

Q. Are you sure it was not in some of the regular appropriation bills?—A. I am quite sure it was not. It was chapter 294, entitled "An act to increase the water-supply of the City of Washington, and for other purposes." (22 Stats. L., 168.)

By the CHAIRMAN:

Q. That act provided—

That the Secretary of War shall cause to be made a survey and map of the land necessary to extend the Washington Aqueduct from its present eastern terminus to the high ground north of Washington, near Sixth street extended; and of the land necessary for a reservoir at that point, the capacity of which shall not be less than 300,000,000 gallons.

Then, after providing for condemnation of land, etc., and the vesting of the title in the United States, it provides in section 2—

That the Secretary of War be, and he is hereby, authorized and directed to extend the Washington Aqueduct from its present eastern terminus to the high ground north of Washington, near Sixth street extended; and that he construct at that point a reservoir of the capacity of not less than 300,000,000 gallons, erect the necessary gate-house, and lay such main connections as may be necessary to furnish Washington and Georgetown an ample supply of water.

Then there followed an appropriation to pay for land for the extension of the aqueduct, amounting to $51,370; for extension of aqueduct to the high ground before mentioned, $599,534.55; for the necessary main connections, $165,400; to pay for land for reservoir, $35,250; work and material in constructing reservoir and gate-house, $431,273.75. If I understand you, the estimate on which these appropriations were based was an estimate for a surface conduit.—A. Yes, sir; the crossing of Rock Creek, as expressed in the report, to be either by tunnel or by a gang of iron mains.

Q. That was the scheme, at that time, of whom?—A. Of Major Twining and Captain Hoxie.

Q. Major Twining was the Engineer Commissioner of the District?—A. Yes, sir

Q. And Captain Hoxie?—A. Was his assistant in charge of the water department.

Q. At that time Congress, on the 1st of July, passed an act (22 Stats. at L., 143) declaring "that the operations of the water department be under the direction of the engineer's office of the District, subject to the control of the Commissioners," if I understand you. In fact I am reading from the statute.—A. Yes, sir.

Q. So that when this estimate or this plan of Captain Hoxie and Major Twining was made, the executive control of the whole of the water supply was in the District Commissioners?—A. Yes, sir; but this statute, I think, placed these new works under the Secretary of War.

The CHAIRMAN. Yes, taking them both together. The special statute as to that particular subject would undoubtedly override the others.

Q. Those estimates you speak of as being based upon computations and other operations in the District office, and having been sent from that office to Congress, were followed by the appropriation of the same sums that were estimated for, do you understand?—A. Yes, sir; exactly the same sums.

Q. You are now connected with the District office, are you not?—A. Yes, sir.

Q. How long have you been there?—A. I have been there since June, 1886.

Q. As assistant to the Engineer Commissioner?—A. Yes, sir.

Q. You are familiar with the papers and files of the Engineer Commissioner's office, I understand?—A. Yes, sir.

Q. And in that particular office of the Commissioner, all the papers and files relating to the water question should be, should they not?—A. Yes, sir.

Q. That particular department of the Commissioner's work is all there, or should be, should it not?—A. Yes, sir.

Q. Have you ever examined all the papers, going back to 1881 or 1882, in the files, so that you would now know what was there and what was not?—A. No, sir; not in any complete and systematic manner.

Q. Have you ever seen any papers, drawings, or anything else that was in the form of writing or sketching, in that office, relating to the

extension of that water supply mentioned in these acts that we have referred to?—A. No, sir; I have not.

Q. Have you ever searched for any such?—A. Yes, sir; there was a letter came down from you the other day, and we made a search to try to find anything that was there relating to that, and could not find anything.

Q. The Commissioners, in their reply to my application, say that "there are no plans, drawings, or estimates concerning the tunnel scheme," and that refers to the tunnel scheme as now existing. They do not say whether there are any plans, drawings, or estimates concerning any other scheme, like this conduit scheme, around the hills, for which Congress appropriated money. You say you have searched for what?—A. For everything connected with this work, the tunnel and reservoir.

Q. "This work" is the tunnel?—A. Yes, sir.

Q. Have you searched for any record, any suggestion, any proposition or scheme for bringing water, other than by this tunnel, from the present reservoir to the new reservoir through the tunnel?—A. I searched more particularly for the drawings. I could find no drawings; there are none on file in that office.

The CHAIRMAN. When you leave us to-day I wish you would be good enough to make a systematic search, together with Major Raymond, of all the papers, letter-books, everything in the Commissioners' office under different departments, where you could possibly imagine such papers to be, and bring to us on Friday morning at 10 o'clock everything you can find on the subject of getting water from the present distributing reservoir around to the northern or eastern part of this city; not merely the tunnel, but the papers which would bear upon the question of this act of 1882 that you have spoken of; any paper that has any reference to the getting of water over into this part of town by cast-iron pipes coming directly from the reservoir or through back streets; so that you will be able to tell us with certainty that you have brought everything that can be found on diligent search, or else that you know to a certainty that there is no such thing there. Any thing that is in print you need not bring.

The WITNESS. I will make the search.

Q. This act of 1882, having provided for an extension of the surface conduit to the north of town and appropriating money for that purpose, when was a change made from that scheme to the present one?

The WITNESS. Of course, Senator, in what I say previous to my connection with it I can only tell you from my understanding.

The CHAIRMAN. So I understand.

The WITNESS. My understanding is that this tunnel grew out of the proposition to tunnel under Rock Creek.

Q. That is, to tunnel under it for the purpose of a surface conduit?—A. Yes, sir; to pass Rock Creek. They found, on computation, that if solid rock existed, which would not require any lining, it would be cheaper to extend the aqueduct in that way in tunnel rather than to construct it on the surface. Other things were also considered to be in favor of that plan. The passage of Rock Creek caused those having the matter under consideration to devise some scheme of extending it all the way in tunnel, and it was approved provisionally by the Chief of Engineers, provided it was demonstrated that there could be found solid rock all the way; and to that end experiments and soundings were made in various parts of the country, and an experimental shaft was sunk at the side of the new reservoir until it went down into good solid rock. That

being at the deepest point and farthest away from the surface, it was considered that it was proven that there was good solid rock all the way, and the tunnel scheme was then adopted.

Q. That was the next year, 1883?—A. Yes, sir. It took nearly a year to sink that trial shaft; I think fully a year.

Q. And that was Captain Hoxie's invention; was he the person in immediate charge of that work?—A. Yes, sir.

Q. When he was making those experiments was he acting under the Chief of Engineers and Major Lydecker, or was he acting under the Engineer Commissioner?—A. The Secretary of War placed Major Lydecker in charge of these new works, in addition to his duties as Engineer Commissioner, and Captain Hoxie was his assistant, both as connected with the Engineer Commissioner duties and this work too.

Q. Major Lydecker having succeeded Major Twining, who died that year, I believe?—A. Yes, sir.

Q. The present new reservoir is not anywhere near Sixth street extended, is it?—A. Yes, sir; it is between Sixth street west and First street west.

Q. It goes from First to Sixth?—A. Yes, sir; it would really be about on the line of Fifth street extended.

Q. So that the reservoir is built substantially where the act of Congress to which you have referred contemplated?—A. Yes, sir; the same location.

The CHAIRMAN. There does not appear to have been any change in the law of 1882, to which we have referred, bearing upon this question, until the act of July 7, 1884, and that merely provided (23 Stats. L., 253) an additional appropriation for land for the reservoir taken under the act of 1882, of $87,500. That was followed by an additional appropriation of a like amount for the same purpose by the act of March 3, 1885 (23 Stats., 457), both being subject to the provisions of the act of 1882.

The WITNESS. I would like to say, Senator, that I think a great many of the papers that have figures and things of that kind with reference to the computations that were made were removed from the District office when the aqueduct office was started, and were taken over there. There would probably be more chance of finding things over in that office than there is in the District office.

Q. You may tell us what was found when the work was begun and they began to sink these five shafts; how much further down, if any, they had to go to get to what they consider to be suitable rock, than had been contemplated in the previous estimate.—A. I think that the only shaft that was sunk any particular depth further than was contemplated originally was the west shaft.

Q. How much further down did that go?—A. That went down to about 90 feet in depth.

Q. Fifty feet below the contemplated depth?—A. Yes, sir; and the other shafts were sunk approximately to the depth that it was intended when the estimates were made. The depths of all these shafts are given in the report.

Q. The work then really began after you had come on?—A. Yes, sir.

Q. And it was under your superintendence how long?—A. Until May, 1886.

Q. Taking the calendar year, 1884, what progress was made in that year?—A. I think all the shafts were completed, if my recollection is right and the tunnel was started in each direction.

Q. What progress was made in 1885?—A. The tunnel was extended, I think, some headings met before the end of that year, and the lining

was put in in places where it was necessary to do it only to preserve the lives of the men and for the general safety of the tunnel, particularly where the work was bad. The appropriation was seen to be a little too small to complete the work, and efforts were made to complete the holing of the tunnel rather than to spend the money for lining the portions which would probably have to be lined.

Q. What length of the whole tunnel of 4 miles, I will call it for the sake of brevity, down to the end of December, 1885, had been holed?—A. I can not remember that. Those things are stated in each monthly report to the Chief of Engineers, exactly the length that was holed and the length that was lined. I can tell it from this map. I think at the end of 1885 every heading had been met except at the east shaft and Champlain avenue.

Q. If you can take the report of the 31st of December and tell us how much remained altogether to be excavated, we would like to know it.—A. (After making calculation.) 2,479.4 feet.

Q. That much remained yet to be done?—A. Remained yet to be driven; yes, sir.

Q. Turn back to the 31st of December, 1884, in that book and tell how much remained to be done then?—A. This does not state how much is to be done, but states how much was done.

Q. Tell us how much was done.—A. (After making a calculation.) Seven thousand six hundred and ten feet, and the amount of excavating remaining to be done is 43,079 feet.

Q. In that first year of operations under your immediate supervision how did you find the rock, in general, as it went on, as compared with what it was expected and estimated to be?—A. The shafts were all started in what appeared to be very good rock. The worst rock was in Champlain avenue shaft. That was very hard; it was rather seamy, but still it was considered to be pretty good rock, and there was no indication that going any deeper would give any better result. I think we had about 58 feet of that rock above the tunnel. I think all the work done in Rock Creek tunnel, driven from the Rock Creek shaft, was in very excellent hard rock, with possibly one or two little seamy places. In the west heading, after we got in the tunnel from Champlain avenue, we found some very poor rock, which broke very badly. In the east heading it was apparently very good rock when we went through, but on exposure to the air it deteriorated very much. After a while we passed through that and got into the hardest rock we had anywhere in the tunnel. In the eastern shaft we were in excellent rock for 200 or 300 feet or more, I can not remember the exact figures. Then we got into bad rock, and then it alternated, bad and good. From the Foundry Branch shaft the rock was mostly very good. There was a peculiarity about a good deal of the rock. When it was apparently very hard when we went through, we found that it degenerated on exposure to the air and moisture, so that a good deal of it was rendered rather unsafe. A good deal of it was exceedingly hard, but it occurred in seams. There were seams in it in such a way that it rendered it liable to drop.

Q. And liable to leak also, I suppose?—A. Yes, sir.

Q. Then, as a whole, as the work progressed, how did you find it to be as compared with what you had expected it to be when the estimates and probabilities on which the work started were made?—A. It was a good deal poorer apparently than it had been expected to be by those who planned this work.

Q. And did I understand you to say that the tunnel has only been

built lower than the original design and estimate at the western shaft near the reservoir?—A. Yes, sir.

Q. How far east does that lower drift run before it strikes the level originally intended?—A. About at the Foundry Branch shaft. I do not think, Senator, that there was any definite understanding exactly as to how deep the tunnel was to be.

Q. What is the distance from the west-reservoir shaft to Foundry Branch shaft?—A. About 2,400 feet.

Q. Did you make any special report to Major Lydecker on the subject of the disappointing character of the rock as the excavation went on, from time to time, in that first year?—A. I can not say that I made any formal report. I was in constant consultation with him, showing him specimens of the rock.

Q. Did you and Major Lydecker in that first year, when talking over these questions about rock, etc., consider the question of what could be done in respect of the rock as you found it in regard to carrying water?—A. Yes, sir.

Q. What conclusion did you come to?—A. The question came up about the necessary lining to be put in and it had apparently been planned to put in a concrete lining, arching wherever arches were necessary.

Q. It had apparently been planned?—A. Yes, sir.

Q. How did you get at that?—A. The specifications and contract with the contractors said that wherever lining was necessary it would generally be done with concrete, the excavated rock being used for that purpose. The contract also provided for brick masonry in the tunnel and in the shaft, and for dry stone packing; and when the necessity for putting in the lining occurred it was contemplated by me to put in a lining as had been mentioned in the specifications, but on canvassing the whole subject and having interviews with other engineers, I came to the conclusion that it was utterly impracticable to use concrete for that purpose, and I so reported to Major Lydecker, and it was then understood that they should use brick instead of concrete.

Q. In the discussions between you and Major Lydecker in that first or second year in regard to this excavating, did you take up the matter of whether the amount of money necessary to be expended would or not be vastly increased above what had been contemplated by the act of Congress?—A. I did not discuss it with him at all.

Q. Did you yourself make any computations as to the character of increase above the original estimate of expense arising from what you found the real character of the rock to be?—A. I did in 1885.

Q. What time in 1885?—A. The latter part of the year.

Q. Did you make any report upon it?—A. Yes, sir; and that is included in the report of Major Lydecker; it is the estimate on which the appropriation of $395,000 was based.

Q. Was that estimate made for brick lining all the way?—A. Brick lining of whatever portion of the tunnel was to be lined with dry stone packing.

Q. But down to that time you had not yet come to the conclusion that all should be lined?—A. No, sir; I never came to that conclusion.

Q. At that date what portion of the 4 miles did you expect to be lined?—A. A little over one-half.

Q. At that time had any concrete lining been put in, or brick lining?—A. There had been some brick lining.

Q. To what extent?—A. I suppose 600 or 800 feet altogether, in different places.

Q. That had been put in primarily for the security of the workmen?—A. Primarily; yes, sir.

Q. How was the packing behind this brick lining that was put in?—A. It was generally with dry stone.

Q. Did you inspect that yourself from time to time as the work went on?—A. Yes, sir; not only was it packed with dry stone packing, but every little while, depending upon the character of the rock, we would build brick walls extending over the brick arch clear up to the rock, and those were called collar-walls, and were about 24 or 26 inches thick.

Q. But with the dry stone packing in those places you filled up behind the brick lining entirely, behind and above it?—A. Yes, sir; as well as we could. There were some places where we could not get the dry stone in, one place particularly that I remember, and that was filled in with cord-wood.

Q. Why did you put in cord-wood?—A. To hold up the rock so that we could get the arch under it.

Q. But that was not put in as a permanent work?—A. That was a matter for future consideration, as to what would be done with that. It is a matter which I reported to the Board of Engineers that was convened by authority of Congress.

Q. At those places where the cord-wood was put in, how long was the cavity occupied by that cord-wood?—A. I can not tell you exactly; it was probably 40 feet long, broken up about 15 or 20 feet, I think.

Q. And extending the whole width of the tunnel?—A. Pretty nearly; yes, sir. It went up into a sort of point.

Q. A kind of dome?—A. Yes, sir.

Q. What was the thickness of the brick lining under that dome?—A. I think we increased it there.

Q. To three rings?—A. More than that; the ordinary lining was three; when we increased it went to either four or five rings.

Q. On top of that what thickness of dry stone packing did you put?—A. Just as much as we could get in under the timbers and the cord-wood that was in there.

Q. Did you put in the cord-wood before you put in the packing?—A. We had to have that in there; we put it in with timber and packed in with cord-wood to hold it there while we put in the masonry.

Q. Where did the timbers rest while you were putting in the masonry?—A. On the side pieces.

Q. Outside of the regular brick-work?—A. Yes, sir.

Q. And those timbers were left there?—A. Yes, sir.

Q. And the cord-wood was put in on top of those timbers, stuck in between them, and so on?—A. Yes, sir.

Q. To return to the question, how thick was your pipe of dry stone packing in perpendicular thickness over the key of the arch there?—A. I can not tell you exactly.

Q. Tell me as nearly as you can?—A. I do not suppose that in some places there was a very great deal, because the timbers came right, nearly, to the top of the brick arch.

Q. That is, the cross-timbers supporting the work above?—A. Yes, sir.

Q. Were there any spaces, do you think, where there was not any?—A. I have no doubt there were. There were some places where we could not get it in.

Q. You thought at that time that the brick arch alone would sustain the pressure of the water from the interior?—A. I never regarded it as a secure construction or a final construction. When the Board of En-

gineers met that was reported to them, and they prescribed certain means of remedying that.

Q. If you did not expect it to be a secure or a final construction of that brick arch, which was under this dome, stone and timber, why did you make your arch there of four or five rings? That amount would not be necessary to sustain from above these timbers, cord-wood and stone, would it?—A. There is no telling when a big rock, weighing several tons, will fall down and tend to crush through that.

Q. You put it in to resist external pressure instead of internal pressure?—A. Yes, sir.

Q. So that the real and fundamental object of that brick lining there was to resist pressure from the outside?—A. Yes, sir.

Q. And of course, therefore, when it came to the actual water question, which was supposed to be the object of the tunnel, it would be quite a different thing?—A. Yes, sir.

Q. What is the length of that brick lining work there?

The WITNESS. At that point?

The CHAIRMAN. Yes. Is it any longer than the dome which you have spoken of as being 30 or 40 feet, or whatever?

The WITNESS. Oh, yes, sir; I don't know how long it is.

Q. It was put in under your observation and as a place of importance as it respected one aspect of it?—A. Yes, sir.

Q. Can you not tell us somewhere near about the length of that lining work you did?—A. I think that is only one part of the whole. The length of the lining may be 200 or 300 feet.

Q. That was put in all substantially at the same time?—A. Yes, sir.

Q. What was the rest of the 200 or 300 feet put in for?—A. It was rock of bad character, but not so bad as that.

Q. Was it put in with reference to keeping the rock from falling down chiefly, or was it with reference to its being the final tube to hold water under the pressure which must exist?—A. That was put in with general reference to its being final work.

Q. All except the part under this dome?—A. Yes, sir.

Q. That, you say, was not?—A. That was not. I had a plan in my mind for remedying that, which was also suggested by the report of the Board of Engineers.

Q. How was the 200 or 300 feet packed, aside from this dome work which was put in finally, as you expected to stand the pressure of the water? Was it packed with dry stone?—A. Yes, sir.

Q. Packed full?—A. Yes, sir; just as full as they could pack it.

Q. Without any wood?—A. In some cases timber was left in there.

Q. How full could you get it packed; so that the back of the stone came into absolute contact with the roof of the tunnel?—A. Yes, sir; that was the aim, and those were the instructions given to the contractors and inspectors.

Q. In the course of the building of the work under your immediate supervision did you at any time discover any deficiency in the manner in which the work was being done?—A. I was down there very often, and I would endeavor to inspect it and have it well done, and whenever I did find anything wrong I would call the attention of the workmen, foremen, and inspectors to it, and endeavor to have it remedied.

Q. The question is whether you did find anything wrong?—A. I can not recall anything as to the details; I have no doubt that I did, though, a great many times.

Q. If you did find anything wrong, would it appear in your monthly report? I believe that is as often as you reported regularly, was it not?

—A. Yes, sir. It would not necessarily be in my monthly report, because if it could be corrected on the spot it would be corrected.

Q. Who was the inspector at this particular work we are now speaking of?—A. I can not remember.

Q. Would you remember if you saw his name?—A. No, sir; we had several inspectors, and I think it would be a matter of record which could be readily seen.

Q. Would the records which were then in your possession show who he was?—A. Yes, sir.

Q. It was his business to make out daily reports to you?—A. Yes, sir.

Q. On a certain blank form which was prepared for him?—A. We had daily reports; every inspector was required to make daily reports.

Q. You can not remember his name?—A. No, sir.

Q. Can you remember the name of any of the inspectors you had?—A. We had an inspector named Chadwell, and other inspectors named Harper and Lucas; those were the only three mason inspectors that I remember now.

Q. It would be one of the mason inspectors whose duty it would be to look after the packing?—A. The packing and the brick work, too.

Q. Those daily reports would be in Major Lydecker's office?—A. Yes, sir. We had cross-sections taken, too, at very short intervals.

Q. Was any change in that packing in that whole 200 or 300 feet made during your career there?—A. No, sir.

Q. Now you can tell us how much lining altogether had been put in down to the time that the plan was changed from dry packing to wet.—A. I think perhaps 600 or 800 feet altogether.

Q. Of lining with dry packing put in down to the time they changed to wet packing?—A. I guess 600 feet would cover it all.

Q. And, as you have said, that was not in one continuous line?—A. No, sir; it was in different places.

Q. About how many places?—A. Five places.

Q. Explain to us how it happened that this Board was convened, on whose report it was provided for, and what they recommended, briefly.—A. When an application was made for an increased appropriation to complete the work there was a Congressional investigation.

Q. Give us the date of that.—A. That was in the winter of 1885–'86. It was charged that this masonry lining of brick and dry stone was too expensive and they ought to use concrete, and a number of other things were alleged, which called for an investigation. Mr. Wilson, of West Virginia, was chairman of the committee that made that investigation. After that investigation this committee recommended the appropriation of all the money and said that they were not convinced that any mistake had been made, but that in order to insure that everything was all right they would call for a board of engineers. That board of engineers was convened, I think, in July; I think they met in July. They recommended generally the substitution of rubble-stone masonry backing and outside of the brick arch for the dry-stone packing. They also recommended that in those places where cavities had been left with cord-wood, etc., that means should be taken to fill them with a better and more resisting medium for the transmission of pressure.

Q. And that culminated in a decision by the Secretary of War or Chief of Engineers to resort to wet packing?—A. Yes, sir.

Q. Can you give us about the date when that occurred?—A. Work had been stopped in the winter of 1885–'86 for lack of appropriation. The new appropriation was available on the 1st of July, 1886, and this

board immediately met and made this recommendation, which was adopted, and all work done since then has been under that recommendation.

Q. So that when you left the work the excavation was not entirely complete?—A. No, sir.

Q. And the only lining put in was that which you have already described as probably 600 feet altogether?—A. Yes, sir.

Q. And in the particular places which you have mentioned, of the character you have described, there was dry-stone packing put, according to the plan as it then stood?—A. Yes, sir. I would like to say that I always considered that there is a very important force that would help that packing very much and help the tunnel, and that is the pressure of the outside water, which would filter in and get on the outside of the masonry and between the bricks. That is a force that ought not to be overlooked in any proper consideration of this work. It is a force due to head from the surface down to the tunnel. When we drove the tunnel along in several places we drained wells in which the water stood at just about the height or above the height at which the water would have backed up into the well from the tunnel if there was communication from the wells to the tunnel. It would be evident, I think, that if this brick arch was perfectly water-tight and the water would come down from that well or from the surface it would exert a great pressure on the outside of that arch fully equal to the pressure that would be exerted by the water from the inside of the tunnel.

Q. It would be a question of head, of course?—A. It would be a question of head.

Q. And of which head would exert the greater pressure?—A. Yes, sir; that is a matter which will add very much to the safety of the tunnel to convey water from one reservoir to the other.

Q. How far away were these wells that were drained by this excavation?—A. They were generally very near the line of the tunnel.

Q. How far was the most distant one?—A. I do not think it was over 300 feet.

Q. On which side of the tunnel?—A. To the north.

Q. Were all to the north that were drained?—A. At one time I had a plat showing the wells, their depths, and everything; and some of them were south of the tunnel a little. This was particularly the case with the wells toward the east, toward the new reservoir.

Q. How much water came into this tunnel daily before you stopped and allowed it to fill up?—A. At the rate of about half a million gallons a day. A good portion of it came from the shaft, dripping down from the shaft; probably half of it or more came in that way.

Q. Do you mean that water ran in from the surface, from the top of the shaft?—A. Yes, sir; from the earthen strata that were passed through in coming down.

Q. But you did not let any surface-water run in from the top of the shaft, did you?—A. Yes; we could empty it out. That was simply in process of construction. That will all be stopped when the shafts are completed. The shafts are not completed yet.

Q. But when you opened a shaft could you not so embank it around as to keep the water from running in from the surface?—A. In the east shaft we went down over 100 feet and sometimes we struck in quicksand and the water would come in; we could not keep it out.

Q. That is true when you got below the surface; but I am speaking of surface-water.

The WITNESS. You mean surface-water exactly?

The CHAIRMAN. That is my question.

The WITNESS. I mean the water of the varying strata near the top.

Q. It was water that came out of the rock when you were working in rock that had seams?—A. Yes, sir.

Q. The amount of that water was how much?—A. About half a million gallons a day.

Q. So that the pumping operations during your time had to amount to half a million gallons a day?—A. Yes, sir.

Q. Do you know how long a time it took for the tunnel to fill up, what was then excavated of it, with water, after the work was stopped?—A. No, sir.

Q. How many pumps were used in keeping the tunnel clear of water while the work was going on under you?—A. One at each shaft.

Q. That would be five pumps at that west shaft?—A. At that west shaft we only worked there a little while. That was not really a working shaft. We only had four pumps.

Q. How many depressions are there that would not drain into the Rock Creek shaft bottom of the tunnel as constructed?—A. Three; there is also a little one at the western end.

Q. Four in fact, then?—A. Yes, sir. That at the western end would nearly all be drained out, but not entirely.

Q. So that to clear the tunnel of water, as it now exists, that exterior to the lining, as it will exist when it is all done, it would be necessary to pump at five places?—A. Yes, sir.

Q. How nearly did the carrying of the drift of the excavation into all these various shafts and headings, after you took charge, conform in point of execution to the requirements of the contract and specifications and to your plans and drawings?

The WITNESS. You mean as regards the size?

The CHAIRMAN. Yes; first, as regards the size.

The WITNESS. There was considerable excess of excavation above that required, probably 30 or 40 feet ordinarily.

Q. How did that happen?—A. It happened in blasting the rock in order to get out the size required. The contractors would blow it out to a larger size, preferring to do that rather than make it smaller, by blasting and trimming it afterwards; it was more advantageous for them.

Q. How would it be more advantageous for them in that respect, as respected their contract, when they came to put in the lining, either with concrete or brick masonry and dry packing, or with brick masonry and masonry rubble packing?—A. It would cost more to put in the lining.

Q. Suppose they were paid by the cubic yard for the packing?—A. That is what would make it cost more.

Q. They would have a great deal more work to do at the fixed compensation per cubic yard in that case?—A. Yes, sir. They got no pay for the excavation beyond that which was ordered.

Q. But they got paid for all the packing of the lining?—A. Yes, sir.

Mr. RYAN. They would make a hole, but get paid for filling.

Q. You say they thought it was better for them to blast down more than to conform strictly to the lining required?—A. That is the only way in which this work is ever done.

Q. That is not an answer to my question.—A. Oh, yes; it is easier for them.

Q. You say that is the only way in which that kind of work is ever done?—A. Yes, sir.

Q. Is it usual to make contracts to fill up that kind of work and pay for it outside of the line that is contemplated?—A. Yes, sir.

Q. So that it would be no unfairness or breach of contract toward the United States for them to blast out as large a hole as was convenient for them, and then get paid for filling it up?—A. I speak for myself individually. It was one of the constant troubles with me to keep the size of the tunnel down to the limit prescribed. Our records will show that I wrote them a good many letters and made suggestions to them and did everything that I possibly could with that end in view.

Q. Why did you complain of it?—A. Because in some instances it was blown a good deal larger than I thought it ought to be blown, and it was a matter very largely of educating the men to put in proper blasting powder and to put their holes in the proper direction to make the proper blast so that they would not blow down too large a mass. They endeavored undoubtedly to blow it out just as near the size of the tunnel as they could.

Q. What makes you think so?—A. Because I think the extra cost to them of removing this rock that was blasted out was far more than the profit that they would make by putting in the lining.

Q. It would not be if they got paid for lining that they did not put in, would it?—A. No, sir; I examined through the work of the New York aqueduct to see what percentage they had. I think they had a very much larger sized tunnel than this one, and had an excess of rock blown down above the prescribed limit of 33 per cent. Ours was a much smaller tunnel than that, but the percentage of rock blown was considerably above that.

Q. What was the excess?—A. Ordinarily it was nearly 50 per cent.

Q. Have you ever computed it?—A. Yes, sir; at the time I made my calculation for the estimates I computed it.

Q. And the result of that computation was that the excavation was—what percentage larger than was required for lining the tunnel?—A. I think it would average about 50 per cent.

Q. Would you consider that to be good administration in carrying out a contract?—A. Yes, sir.

Q. If it were good administration why did you complain of it?—A. I did not complain of it except when in some of the sections it got to be very bad, and I would endeavor to reduce it as much as possible.

Q. When it got above 50 per cent. you began to complain?—A. Oh, no, sir; I did not compute that until a large amount of it had been done, but I exercised constant supervision and constant effort, without computing it, to keep it down, and when it was apparently getting larger than it ought to be, I would take the minimum that they would blow it to, and try to get them to work down to that.

Q. How much void space would have been in the tunnel when you left it, had a brick lining three tiers thick been put in through the whole length of that excavation without anything above or behind it?—A. We had four different cross-sections, for which we paid the contractors.

Q. I am not now on the question of what you paid; I merely want to know how many cubic yards of vacant space would be left outside of the brick lining, three tiers thick, if nothing whatever had been put behind it or above it.—A. That is a question I can not answer, because there were different sections where timber was required above, on the top, and the sides where there was fully as much area outside the brick lining as there was inside, and there were other cases where by simply putting a timber across the top it would hold the roof until we could get the masonry under.

Q. But you say you made a computation in which you figured out that the excess of excavation above what was required for lining the tunnel was 50 per cent. Now, how could you get 50 per cent. without knowing the total bulk?

The WITNESS. If you will permit me to refer to a book here perhaps I can answer.

The CHAIRMAN. Certainly; refer to anything you want.

The WITNESS. I remember that I worked that out once, and that is in one of these books here, I think.

(The committee took a short recess while the witness examined the books.)

AFTER RECESS.

The WITNESS. I will read from the testimony that I gave before the other investigating committee, to be clear on the point on which the chairman interrogated me. The testimony is found in Report No. 3109, House of Representatives, Forty-ninth Congress, first session. I read from page 56:

Captain Hoxie, in his estimates for the use of concrete, has provided for an excess of the actual breakage of the rock above the prescribed section of 24 per cent. That is the margin. If there is one thing I have worked hard at in this tunnel it has been to keep down this excess, and it is a thing that every man works hard to keep down. In New York with their large sections of tunnel the excess is about 33 per cent. In those portions of our tunnel which have been lined and which it was not necessary to timber, some parts of it in Champlain avenue and some in the heading driven from the east shaft, the excesses were greater. In Champlain avenue the excess above the prescribed sections was 63.3 per cent. In the east shaft it was 62.2 per cent. This of course is excessive, because in those cases the rock was very bad. Besides that, the men have to be educated to it. Every man in the tunnel has to be educated to do the work well. In the final lining of those portions of the tunnel which do not require timbering it is only possible to estimate it, but I estimate that the excess will be from 40 to 50 per cent., which, if it were filled up with concrete, would be very expensive; much more so than is provided for in this estimate.

Q. What was the provision in that estimate?—A. That all the lining should be concrete.

Q. I thought you said Captain Hoxie's estimate was for concrete?—A. Oh, yes.

Q. And that that would cost much more than is provided for in your estimate?—A. Oh, yes; that is the estimate on which the appropriation of $395,000 was made.

Q. For dry packing?—A. For dry packing.

Q. That was less expensive than concrete?—A. Yes, sir.

In his estimates which he calls his timber estimates, in those sections in which we have had to timber and line, the excess in the Champlain avenue heading is given at 83.4 and in the east shaft at 93 per cent. above the area occupied by the brick masonry, all of which had to be filled in in some way or other.

The other part of the testimony has no connection with the present inquiry.

Q. Is that the only answer you are able to make to my question?—A. Yes, sir; I do not understand that I can give any other. It is a matter which constantly varies.

Q. My original question did not refer to what varied. It referred to what was the cubic contents of the tunnel as excavated exterior to a brick lining, without regard to what was to fill up those vacant spaces.—A. Well, the rock was of such a nature as not to require any timbering. It was broken just as close to the brick lining as the contractors could break it.

Q. You do not appear to understand the question yet. The question

is this: There was a tunnel drift run clear through the rock. When you left it it was run almost through?—A. Yes, sir.

Q. Inside of that rock excavation we will suppose there is put a brick tunnel, which shall be of the height the interior of this tunnel as lined is intended to be—9 feet and something, is it not?—A. Yes, sir.

Q. And of the width it is intended to be. What would be the cubic amount, in yards, of the space outside of that brick tunnel?—A. The average would be about 1½ to 2 cubic yards per running foot.

Q. That would be 4½ to 6 cubic yards for every 3 feet of distance, then?—A. Yes, sir.

Q. Just take a pencil and make a calculation and give me the total.—A. One and a half cubic yards to each cubic foot would be 31,034 cubic yards. Two cubic yards to the running foot would be 41,378 cubic yards.

Q. What was your calculation in regard to the amount of sediment, if any, that would be deposited along in the bottom of this tunnel?—A. The amount of sediment carried in the water as it leaves the distributing reservoir is so slight as to be almost incalculable. It is a fact that during the whole thirty years almost that that reservoir has been in use there has been less than a foot of sediment deposited in the bottom of it, as near as we can tell. My idea was that there would never be much of any sediment deposited in the tunnel. I have made a good many experiments, putting the water away in bottles when it was at its worst, and found it took about two weeks to settle completely when in a state of perfect rest; and as I knew the water would run through the tunnel in about a day I reached the conclusion that there would be very little sediment deposited in the tunnel. I never could make any calculation that would show there would be a deposition of sediment in the tunnel that would amount to anything.

Q. Therefore you left that element out of account in regard to the sufficiency of the work and in regard to any provision for clearing the tunnel of sediment?—A. No, sir; I did not. I made a provision for clearing the tunnel of sediment in my plans.

Q. Tell us what the provision was?—A. I considered whatever sediment was deposited would be deposited at these low points in the tunnel, that is, the great majority of it would be deposited in the low points near the shaft.

Q. At these five places?—A. Yes, sir; particularly four places, because the first one would never have any deposit; because the water would tumble in there and it would be in a constant state of commotion. I proposed when the shafts were finally finished, at the Rock Creek shaft for instance, to put down a 4-foot well, reaching nearly to the bottom of the tunnel, with a valve on top emptying out into Rock Creek; and then at any time it was desired to pump that part of the tunnel, if this gate were opened at the surface of the ground, the water would rush up through the pipe and rush out into Rock Creek in very great volume, through a 4-foot pipe that would suck all the sediment through the bottom of this pipe for a long distance, and carry it up and out; and I made the same provision at the other shafts.

Q. What was the calculated height of that blow-off above the bottom of the tunnel?—A. It would be about 50 or 60 feet; I guess about 60 feet.

Q. That would give you a head at the receiving reservoir of how much above that 50 feet?—A. That would give a head at the outlet below the distributing reservoir of about 120 feet.

Q. That being the case, did you contemplate putting in any perma-

nent pumping plant there?—A. Yes, sir; I had always contemplated that it might be necessary at some time to get into this tunnel and to pump it out; and it had been my idea for a long time that we should establish a large pumping station in the vicinity of Rock Creek shaft, to supply all the high ground with water; that the water should be delivered at a pumping station there, and that large mains should go over to Georgetown and the country around Tennallytown and Mount Pleasant and all that section which is now very inadequately supplied by the pumping station at Georgetown and by the pumping station on New street; at that point at the Rock Creek shaft have a large pumping station to do all this work, and at the same time have it there in case it was ever necessary to pump out the tunnel and get into it.

Q. Did you think it would be good economy to let the water go down 120 feet below the distributing reservoir and then pump it up to points which were higher than the distributing reservoir? Would not that 120 feet be a dead loss of lift?—A. No, sir; we would have the pumps up at the level of the distributing reservoir on the hillside somewhere, and the water would come up to the pump.

Q. If you had the pumps up there they would connect up there, I suppose?—A. Connect right down through the shaft, and the water in the tunnel under this pressure would lift right up to the pump. It would rise up to the pump, which would be about the same level as the distributing reservoir. I do not know that I make myself clear.

Q. I think I understand you. It would be equivalent, then, in point of weight to be lifted, as you think, substantially to lifting it from the level of the distributing reservoir?—A. Yes, sir; just the same. There would be no more pumping to be done than if the pumps were at the distributing reservoir.

Q. Did you make any estimate of the cost of a plant of that description?—A. No, sir; that was a matter which I did not consider at all until I was sent to duty in the District office and had charge of the distribution of the water there. Then I considered it as part of the distribution system.

Q. But as connected with the construction of this tunnel, while you were in charge of that, you did not consider that any pumping works were necessary, I infer?—A. No, sir; not particularly. I had looked into the matter and partially planned out a system by which the tunnel could be emptied. I considered a great many methods by which the tunnel could be emptied, if necessary, in the least possible time.

Q. Did you make any report of that?—A. No, sir; it was while I was considering that that I was relieved from duty there, during the time when there was no work going on.

Q. No official report to the Chief of Engineers or the Secretary of War, or from them to Congress or any of its committees, as to the amount of money that this thing was going to cost, embraced anything in regard to pumping works to clear the tunnel, or anything of that sort?—A. No, sir.

Q. Have you any idea now of what a permanent pumping plant would cost, sufficient in size and capacity to free in ten days that tunnel and the hole in the ground exterior to the lining as well, assuming that it got full of water, as in case of a break?—A. I should say, roughly, it would cost somewhere in the vicinity of $15,000 or $20,000.

Q. Do you know how long it took to pump out this tunnel at the time it was pumped out?—A. I think it took about thirty days.

Q. How many pumps were going?—A. There was a pump at each shaft, I think; but their pumps were not at all efficient.

Q. Do you know how many gallons of water were pumped out to clear the tunnel?—A. No, sir; I think the tunnel held somewhere about 30,000,000 gallons. I am not positive of those figures; I have made a calculation, but I could not remember the figures now.

Q. To pump it out in ten days you would have to pump 3,000,000 gallons a day?—A. Yes, sir.

Q. Do you think a pumping plant that will pump 3,000,000 gallons a day could be established there for $15,000?—A. Very readily; yes, sir; in fact, it would not all be there; there would be one large pump there and two small pumps at the shafts.

Q. That includes the buildings for houses and everything ready for operation?—A. Yes, sir; I don't know how much the land would cost.

Q. It includes everything but the land?—A. Yes, sir; I think it could be done for that. I went to New York and looked at the plans they had there for emptying their shaft at the Harlem River. They had a number of different plans; they had a very simple plan, and they could pump it very rapidly and very inexpensively.

Q. Three million gallons a day would be about 100,000 gallons an hour, would it not?—A. Yes, sir.

Q. Call it in round numbers 100,000 gallons an hour. If you wanted to pump 100,000 gallons an hour to a height of 50 feet, how large a cylinder and what length of stroke and what rapidity of movement would you require?—A. The pump I think to be applicable there would be a pump like they have in some of the mining regions. If we had a well there 4 feet in diameter at the Rock Creek shaft we could have a bucket just a little less than 4 feet in diameter, say 3½ feet and maybe 10 feet in depth, with a movable bottom, and let that down in and fill it up with water and hoist it out, empty it, and let it down again and hoist it out and empty it. We could get the water out of the tunnel in that way quicker than by any other way; by bucketing it out.

Q. That is what you meant by pumping, then?—A. Yes, sir; for that special purpose.

Q. Such a device answers the purposes of a pump?—A. Yes, sir.

Q. I do not know that by looking in a dictionary I should find a pump of that description?—A. No, sir; I think not. It is a device which is used in the mining regions for clearing out a shaft.

Q. It goes there by the name of a pump, does it?—A. Yes, sir.

Q. Have you seen this tunnel in its present condition?—A. No, sir.

Q. How long since you have been in it?—A. I have not been in it since the spring of 1886.

Q. When the original plan of carrying the water by practically surface conduit around to the location of the new reservoir was abandoned and the plan of a continuous deep tunnel adopted, was there any investigation or inquiry into the propriety of that procedure by any board of engineers?—A. I think not, sir. I don't know. I think not, though.

Q. Is it not the usual custom in the office of engineers and in the War Department, in regard to public work under the charge of the engineers, when a serious departure from previous plans and an appropriation of Congress based upon that and with that view is in question, to have it considered on the report of the officer in charge by a board of engineers before it is finally approved?—A. So far as my knowledge goes, it is.

Q. Were you in charge when this change took place?—A. No, sir. The change had already been adopted before I had anything to do with it.

Q. So that during your administration nothing was departed from

that had been previously settled?—A. No, sir; except possibly you might consider the lining was modified; the character of the lining.

Q. When you left charge of the work did you return immediately to the District office as an assistant?—A. Yes, sir.

Q. Did you ever hear anything on the subject of this change of plan concerning the fact that no board of engineers had passed upon it?—A. Yes, sir; it was a matter of discussion somewhat among the officers. I heard a good deal of talk. The matter was referred to the Chief of Engineers. It was a matter of public record. He approved it provisionally, that the officers in charge could establish in their own minds the fact that there was continuous rock all the way through.

By Mr. RYAN:

Q. Which would not require lining?—A. Which would not require lining.

By the CHAIRMAN:

Q. Did you ever hear anything on the particular subject of the departure from the custom and course of business in not having a board of engineers pass upon that case?—A. No, sir.

Q. Thus far we have only been considering the area that was cut out. Now, we would like to know whether in any other respect than in the size of the area there was a departure in cutting these drifts from the drawings of the engineer in charge?—A. Nothing that I can recall of any consequence.

Q. Can you recall something that you do not think of consequence?

The WITNESS. Do you mean as regards the location?

The CHAIRMAN. I mean as regards anything that occurs to you that was a departure from the plans, drawings, diagrams, profiles, specifications, and so forth. You have spoken of the area being larger. Was there anything else that was done differently from what these plans, drawings, and specification called for?

The WITNESS. I can't recall anything.

Q. Was there any departure from the direct line of the tunnel?—A. There were two or three times when there were departures from the right line. When we first started the tunnel the line was given from the bottom of the shaft as well as was possible in order to get the tunnel started in the right direction. At that time we had two engineers employed, each of whom had other duties besides his work on the tunnel. The exact location of the line in the tunnel was a matter which required a great deal of very careful work, and it required also that the tunnel should be built a little way in order to get a proper base established to continue it. After the tunnel had been driven for a few hundred feet from the different shafts it was deemed best to have that line accurately determined by other engineers, so as to be sure that the headings would meet. For that and other reasons the services of Mr. Coryell were secured, and he made a survey, and with other assistance found that the lines were very nearly right all except one, and that one was a little out. It was corrected.

Q. How much out was it?—A. I suppose maybe 4 or 5 feet; I can't remember exactly. It was out so much that if it had been continued the headings would not have met. Then there was another occasion after that. The work went on and our office did the engineering work, giving the contractors the lines and testing their lines every day or every few days, I think, until the latter part of 1885, and then they were constantly getting out of line and they would claim that the defect arose from our engineers not giving them the proper lines, and our

engineers would claim that it arose from their careless workmen. In order to stop all further questions and bickerings of that kind, an order was given to the contractors that they would be required to be responsible for the direction of their lines, and they must employ an engineer to look after their lines and keep them straight. After that they did do it.

Q. How much had they got out at these places you are now speaking of, after they made a start?—A. They got out at one place 5 feet, which they were required to correct by excavating the side of the rock.

Q. And that left a space to be filled up with dry packing?—A. If the tunnel was to be lined at that point, yes, sir.

Q. I notice on the 15th of January, 1885, you appear to have written a letter to the contractors, Beckwith & Quackenbush, as the officer in charge, in which you say:

In the east drifts of Rock Creek and Foundry Branch the excavation of the tunnel from the points established for your guidance has been very badly carried, in fact the line has been disregarded entirely, and you are required to go back at the point where the departure takes place and excavate to the required width and line in both of these headings.

Do you remember that?—A. That is the case I was speaking of just now; yes, sir.

Q. What did they do?—A. I suppose they went back and took out the sides.

Q. What makes you think so?—A. There is nothing further that I remember of about it. If they had not done it I would have probably remembered about it, and there would have been a row.

Q. Do you remember seeing it was done at the time?—A. I can't say that I do; no, sir. I am morally certain it was done, though, or I should remember something about it.

Q. You would be a good deal surprised to know that it remains so now; that they did not go back, but merely made a curve and went on?—A. Yes, sir. I think the work stopped very shortly after that.

Q. This letter is dated the 15th of January, 1885. Did the work stop then?—A. No, sir; it did not. It did not stop until 1886.

Q. You do not know of your own personal knowledge or recollection whether the contractors obeyed your requirement or not?—A. No, sir.

Q. In the next paragraph of your letter to them of the same date you say:

The center line in the east drift, Foundry Branch, is cut off for a distance of nearly 100 feet, being 2 and 3 feet north of the north side of the tunnel excavation. (See sketch inclosed.)

Do you remember that?

The WITNESS. Is that in the east heading of Champlain avenue?

The CHAIRMAN. "The center line in the east drift, Foundry Branch, is cut off for a distance of nearly 100 feet, being 2 and 3 feet north of the north side of the tunnel excavation."

The WITNESS. Yes, sir; I think I remember that.

Q. You say:

In a distance of about 25 feet from the point established by Mr. Coryell the north side of the excavated tunnel strikes the center line, and at a distance of 50 feet the center line is between 7 and 8 feet out of line. This can not be overlooked, but must be remedied at your expense.

Was that done?—A. I don't think it was, because that would involve a great deal of extra expense in putting in lining, and the lining could be twisted around to conform to that, without any detriment whatever,

if the tunnel was to be lined; and if it was not to be lined it would make no difference in the flow of the water.

Q. Why did you say then:

This can not be overlooked, but must be remedied at your expense?

A. The principal object in remedying it would be to have a straight, continuous line of the tunnel to work by instrumentally. A good many things were said to the contractors that were meant to make them more careful in the future, rather than to make them correct mistakes which they would make which would be of very little consequence.

Q. Was this one of them?—A. I can see no particular detriment to they the work from that mistake.

Q. My question was whether this was one of the instances?—A. I don't remember whether it was or not.

Q. You don't know whether it was or not?—A. No, sir.

Q. Do you remember whether you were in earnest when you said this to them, or whether it was intended merely as a stimulus to try and keep them nearer the line?—A. I can't remember. I expect I was in earnest, though.

Q. I think you were. Do you remember having any conversation with them upon that subject afterwards, or anything that led you to change your mind, if you were in earnest?—A. Yes, sir; it was all those things. We had a good deal of controversy about that matter, they claiming that it was due to the incorrect lines given them by our engineers, and our engineers denying it and trying to throw the blame on them. If my memory serves me right they were not required to remedy that, because we were not certain that it was their fault.

Q. Who were your engineers about that particular business?—A. I think Mr. Merrill was the engineer at that time, or Mr. Coryell. I can not remember. If you will give me the date I can tell you.

Q. The date is the 15th of January, 1885, as appears by your letter.—A. Mr. Coryell was the engineer of the tunnel then. He was appointed October, 1884.

Q. He was the engineer at that time?—A. Yes, sir.

Q. He is accessible. He is here in the city, is he not?—A. Yes, sir. It was on account of this controversy that the order was given the contractors that they must employ an engineer, and having once established the line they must keep to the line.

Q. Was that order in writing?—A. Yes, sir.

Q. Did they make any reply in writing to this letter of yours on the 15th of January, from which I have been reading?—A. I can not remember.

Q. If they did, it would be on the office files, would it not?—A. Yes, sir.

Q. And we should have received a copy of it with the other papers?—A. Yes, sir. I know they protested against having to appoint an engineer for that purpose.

Q. But did they do it?—A. They appointed an engineer.

Q. When?—A. I couldn't recall the time without looking over the record.

Q. Do you think it was in connection with the matter mentioned in this letter of yours of the 15th of January?—A. I think it was probably after that.

Q. How long after that?—A. It was that and other things which led up to it. I think if you will let me look at those papers I can find that letter. It required them to appoint an engineer and run the line.

Q. I will look through the papers in a moment and let you know if the letter is here, and will show you the papers also. You go on to say in connection with the last paragraph I read to you:

If it is afterwards found necessary to line this portion of the tunnel you will be required to fill in the enlarged excavation outside of the usual limits with dry-stone packing at your own expense.

A. That throws the whole expense on them.

Q. Yes; if done. But if you did not require them to do anything at all, it did not throw any expense on them?—A. No, sir. There was a long letter written establishing the line of each heading. There was a good deal of trouble to establish the line so that they would have something to go by.

Q. According to these papers furnished us purporting to be copies of everything—of course we don't know but something may have been overlooked—the only communications from you to them after the one I have read are as follows: One of the 13th of February, calling their attention to the fact that you have repeatedly ordered them to commence the work of lining the tunnel driven from Champlain avenue and the reservoir shaft and they have not done so; and you emphatically repeat the order. The next is dated the 6th of May, 1885, in which you again call their attention to slow progress. That is all there is in that letter. The next is dated the 5th of September, 1885, in which you say:

It is found that in driving the tunnel in those portions where lining will be required and the large section is carried, that the area is not kept down properly to the size required for lining.

The large and excessive area is due in the majority of cases to the careless and erroneous location of holes and overcharges of explosives. In consequence a greatly increased cost for the dry-stone packing of the lining is thrown on the Government. You will please take the necessary steps to correct this condition of affairs. If the excess in the area of the excavation required for lining can not be kept down in any other way, it will be necessary to drive the tunnel to the normal section and enlarge it afterwards.

The next and the last is the 17th of December, 1885, in the first paragraph of which you refer to the causes of slow progress in one of the headings, and say they have not good blacksmiths to keep their tools in order, and tell them they ought to make greater progress and ought to consider the expediency of increasing the air pressure. The next letter on the subject is dated the first of August, 1887, and signed by Lieutenant Townsend, which was after you left.—A. Then the letter about the engineer is not in there. I remember that letter very well. It is a very long letter. It called forth a protest from them, I know, and made considerable talk about it.

Q. Do you think it was after this letter of the 15th of January?—A. Yes, sir.

By Mr. RYAN:

Q. You replied to it, did you?—A. Yes, sir. The letter I referred to was one of four or five pages. The letter went on to describe accurately in each heading the point from which they were to work, and then said they would be held responsible for it, and that they must appoint the necessary engineers to keep those lines.

By the CHAIRMAN:

Q. I see in a letter of yours to Beckwith & Quackenbush, about the 20th of September, 1884, you say, in one paragraph:

I would also call your attention to the lack of care in some of the headings, in keeping lines and grades.

That refers to the topic we are now considering.

The west Rock Creek heading is very considerably below grade, and must be raised.

That is all there is upon that point. Then there is a letter of the 29th of September in which you call their attention to their using too heavy explosives; excessive charges, so as to break the heading larger than is necessary.—A. The rock was constantly varying and the same amount of powder that would be proper in one set of holes would break out the rock too much in another. It was an exceedingly difficult matter to make the tunnel uniform in size.

Q. Could not they have put in a smaller charge?—A. Yes, sir; but they had to depend on workmen whose judgment was not always good in every such case.

Q. Do you think that is an excuse for their not doing what they agreed to or were told to?—A. Yes, sir, I do; because the right kind of workmen can not be found about here; skilled workmen in that kind of work.

Q. Can they not be found anywhere in the world?—A. Yes, sir; but there was a great deal of that kind of work going on at the same time; the New York Aqueduct work, for instance.

Q. If that was the case, and they were doing all that was possible, why were you complaining of it all the time?—A. Well, sir, there was a constant effort to keep the work right and stimulate the men.

Q. If they were doing the best they could, as your former answer seems to imply, why were you continually remonstrating?—A. I wanted them to do better all the time.

Q. Here is a letter from Beckwith & Quackenbush, addressed to Major Lydecker, dated January 5, 1885, which was ten days before the letter of yours we have particularly referred to, in which they state their grievances, as they consider them to be, and appeal to the justice and generosity of you gentlemen. They say:

Order of December 17—

Which, I suppose, was the preceding December—

—the compliance with which requires us to do instrumental work and make us responsible for same. The statement is made that this order is justified under a clause in the specifications, which recites—

and so forth. Then they go on to discuss that question. Is that the letter you referred to?—A. Yes, sir; that is the letter I refer to.

Q. That letter of December 17 does not appear in this package, which is chronologically arranged, and goes from September 25 of your letters to December 29. If that was the letter you referred to, then this matter in regard to who was to do the engineering, so far as it was necessary to enable the contractors to follow the line laid down in the drawings and profiles, occurred before this remonstrance of yours of the 15th of January?—A. Yes, sir.

Q. And not afterwards, as you supposed before?—A. Yes, sir.

Q. It having occurred before, how did it happen that you continued on the 15th of January to make such a vigorous expression of these facts, and that it could not be tolerated, and that they must rectify it at their own expense?—A. We tested the lines. They were required to run the lines and we would test them every few weeks, and if they were found to be out, that was what called forth this letter.

Q. Then how could it have been the fault of your engineers?—A. It was not, according to that letter. If our engineers had been responsible for the running of the line then it would be the fault of our engineers; but that shows it was not the fault of our engineers.

Q. That probably would account for the vigorousness of your language, would it not?—A. Yes, sir.

Q. Then you are pretty sure now you were absolutely in earnest?—A. Yes, sir.

Q. I want to ask you again if you can explain to us, having meant exactly what you said, and knowing all the facts and circumstances, why you did not make those people carry out your orders?—A. Well, sir, it might have been overlooked, and possibly was, or it might have been deemed best—possibly that might be the case where it was not determined whether it would have to be lined or not; if it had to be lined it would be just as well to defer that excavation until the tunnel was enlarged for lining. I can't remember, but it would be a very plausible explanation of the thing if the rock was of such character as to require lining in the future, to let that go, and go on with the heading, rather than stop and do that at that time, and then take it up when they came to enlarge for the lining.

Q. Why did you not write your letter that way then?—A. I might not have determined at that time that it was so.

Q. But I understand you to say now that what you have just said is a matter of present speculation; that as a matter of memory you do not remember anything about it?—A. I don't remember anything at all.

Q. You refer in this same letter to the fact that the tunnel may have to be lined; so that that was in your mind at the time.—A. Yes, sir. If it was not done it is possible it was allowed to pass along.

Q. Run your eye over your letters to see how the matter went on from time to time, with a view to answering this question: It appears from your letters to the contractors and from your reports to Major Lydecker that there was a pretty constant and continual observation on your part of bad work and misdoing, want of diligence on the part of the contractors. How did it happen that covering so long a space of time and repeated failures in regard to their duties the contract was not annulled, and that as a practical fact nothing appears to have been done about it?—A. It is my recollection that the principal complaint that was made against them was on account of the slow rate of progress; and they were continually being urged to hurry up. The inspectors were required to report constantly on the number of men. Every day we knew the number of men that were employed and the pressure at the drills and everything of that sort; and while the progress was not anything like such as was called for by their contract, yet a comparison of this work with other similar work and with the means that they employed, did not make it at all clear that any additional progress could be gained by employing anybody else. In general, they pushed the work and did it as rapidly as it could be done. They made mistakes and they were deficient in some things at some times; but always whenever their attention was called to any defect they generally tried to rectify it. I think I can say in general that they tried to get along with the work just as fast as they could. These letters while read in a bunch like this may have a tendency to cause a belief that we did not think they were pushing the work as well as they could; yet the letters were scattered over a long period of time and the complaints I think are comparatively few.

Q. At the time you wrote those letters along from week to week and month to month in the course of your charge of the work you knew yourself what you were writing about, did you not? You were then perfectly familiar with the state of the case, of course?—A. Yes; I

went on to New York to the aqueduct there and compared our progress with theirs, and investigated other tunnels.

Q. Was that the aqueduct that Beckwith & Quackenbush were connected with?—A. Yes, sir. I don't think they were at that time connected with it. I think they have made a contract since then for part of it.

Q. Being perfectly familiar with the situation and what the contract required which they had so recently signed with their eyes open, and having written those letters from time to time as they appear, and knowing as you say the truth of what you were writing, was there anything stated in those letters that was not true?—A. No, sir.

Q. Was there anything stated in those letters that was not then your official and responsible judgment?—A. No, sir.

Q. And yet you say now that you think they did all that could be required of any contractors under the same obligations they were under.—A. Yes; I say that I don't think they could have done anything by which the work could have been expedited to any marked extent.

Q. Knowing the facts, and telling the truth, and being sincere, upon what grounds did you address such communications to them as appear and which you hold in your hand?—A. Of course, in answer to your question, I spoke in a general way. They were oftentimes deficient in power. Their pipes would leak and the power would run down at the drills. They did not have enough carts to transport their material, and these letters were written to them to have them correct the errors into which they had fallen, and to supply the requisite plant in order that the work should go on just as rapidly as possible.

Q. Did they do it?—A. They generally did; yes, sir.

Q. You had better look through those letters and see if in some of them you have not repeatedly called their attention to the absolute necessity of obedience to your requirements which they had failed to obey; and, if so, how do you reconcile that with your last answer?—A. Here is a letter from the contractors which bears upon that point. After being remonstrated with about their slow rate of progress, the letter says:

Yours of this date is received.

Q. What date is that?—A. May 15, 1884.

In reply, will say that we are making a strong effort to comply with the specifications and accomplish the required rate of progress required by them; we have been considerably annoyed by our men leaving us and have but just secured a full complement of men in the Rock Creek heading.

The New York aqueduct work was going on then, and just as quick as the contractors' men here would get well drilled and accustomed to the work the New York men would send agents and get them away, by paying larger salaries or under some pretext or other.

Q. Look along in regard to what took place afterwards, not as to the number of men, but a variety of matters to which you called their attention, as it appears, repeatedly.—A. I would also say that in the first part of this work I tried to hurry them up, to hurry on the work at the rate specified by the specifications, thinking that that could be accomplished, and doing everything I could to carry out the specifications in that way as regards progress. I was new to the work, too. It was a kind of work I had never had anything to do with before, and I have no doubt I made mistakes in judgment. There is no question about that. I might have required impossibilities of them.

Q. Do you think you did? You might do a good many things. Do you think you did anything of that sort, according to the correspondence? Look through it carefully and tell us what you think you required of them, if anything, that you ought not to have required of them according to your present knowledge.—A. Here is one letter about the east shaft in which I tell them that if they do not make better progress they will have to put in duplicate pumps. The pumps got out of order there and that delayed us a good deal.

By Mr. FAULKNER:

Q. Was that the shaft in which they put a 2-inch pipe when the specification required a 4-inch pipe?—A. I do not know. I do not recall what you mean.

The CHAIRMAN. Senator Faulkner refers to the air-pipes for compressed air.

The WITNESS. That was one of the tunnel headings; this is the eastern shaft.

Q. That was one of the causes of complaint?—A. Yes, sir; that was a cause.

By the CHAIRMAN:

Q. Touching the east shaft, was there anything you said to them about that that, with your present knowledge and experience, you think you ought not to have said?—A. No, sir. I say:

I have to call your attention to the extreme slowness with which the work is being carried on at the shaft in the new reservoir. Only 2 feet have been made during the month, and for a number of days nothing has been added to the depth of the shaft. The progress of the work must not be made to depend upon a pump working badly. If any further delays arise from that cause you will be required to put duplicate pumps in the shaft. Such accidents from defective machinery as cause delay for some four or five days at a time should be foreseen and guarded against.

I do not see anything in that letter to retract. That was an exceedingly difficult shaft to work.

Q. You need not read anything until you come to a place which you want to modify with your present knowledge or state that you think you required too much or were mistaken. When you find a place of that kind, tell us where it is?—A. I think there were some of these letters that were written to the contractors very largely with a view to bringing about a discussion as to whether some means could not be taken to expedite the work. I suggest to them in one place that I believe a more rapid rate of progress could be attained by using two drills on one column and then making use of three or four drills in each heading; that in this way more rock could be drilled and blasted out. I remember now we had considerable discussion about that and they made an effort to use another kind of drill with a horizontal bar, in which they could put more drills, and they got it on here at considerable expense, but it wouldn't work.

Q. What is the date of the letter to which you are now referring?—A. January 10, 1885.

Q. Do you mean to say that any part of that letter you consider to have been erroneous?—A. No, sir; I don't think so.

Q. Do you find in looking over those letters any letter in respect to which you can say now you communicated what was erroneous, either in fact, in remonstrance, or in recommendation?—A. No, sir; I don't see anything.

Q. Were you in any way connected with the making of the computation on which the contract was awarded?—A. No, sir.

Q. That was before you came to the work?—A. Yes, sir.

Q. When did you first know Beckwith & Quackenbush, or either of them?—A. Not until after I had been assigned to this duty.

Q. Do you know where they came from?—A. They came from New York, I believe.

Q. The State of New York?—A. Yes, sir.

Q. How did Mr. Coryell come to get employment on that work?—A. I think he had a general application in for a position. We employed a man named Humphreys first and he only stayed one or two days and then disappeared. Then we had the application of Mr. Coryell and several others on file, and Mr. Coryell was written to to know if he still wanted the position, and it was offered to him.

Q. Where did he live?—A. I think he lived in Baltimore. I am not sure—perhaps in Maryland.

Q. Is that application on file now, or should it be?—A. Yes, sir; it should be. Possibly if he filed other letters with it they may have been withdrawn.

Q. Do you remember whether there were any other communications on this subject?—A. I remember writing to him and offering him the position.

Q. That is not my question. My question is, whether you remember any communications on file in regard to Coryell, at or about that time, other than the one you have named as being his own application for employment?—A. No, sir; I don't remember any.

Q. Do you remember anybody speaking to you or to Major Lydecker on the subject of employing Coryell?—A. No, sir.

Q. Did you or Major Lydecker, to your knowledge, receive any letter of recommendation of Coryell from anybody?—A. Yes, sir; we had letters of commendation and letters of explanation as to work he had been on.

Q. From whom were they?—A. I can't remember now.

Q. Should those letters be on file?—A. If they were addressed to the office they should be. If they were general letters of recommendation they would probably be in his possession.

Q. Do you remember how that was?—A. No, sir; I do not.

Q. State briefly what means you took to find out whether Coryell was capable of performing this most important work, for it was important work, was it not?—A. Yes, sir.

Q. And difficult in some sense?—A. Yes, sir. It was these letters very largely, and the explanation which he made of the different work that he had been on.

Q. What did he say he had been on?—A. I can't remember exactly; but it was some of the tunnels in and about Baltimore. I think he said he had been on the Baltimore water-works; but I don't remember now what those recommendations contained or where he said he had been at work.

Q. And you can not remember any of his recommenders?—A. No, sir. So far as I was concerned—he saw both Major Lydecker and myself—my judgment was made largely upon a personal interview with him. My recollection is that before he was offered the appointment he went and looked through the tunnel and made a report. We had a verbal consultation with him in regard to the work.

Q. When did he go on?—A. I think it was in the fall of 1884.

Q. He could not look very far through the tunnel then, could he? They had only turned the shaft, had they not?—A. Oh, yes; the tunnel was quite well along.

Q. It was on your recommendation that he was appointed, was it not?—A. I expect it was; yes, sir.

Q. Your selection of him, you say, was based chiefly on an interview?—A. Very largely. I would not have taken him if the interview had not been satisfactory, no matter what his recommendations were.

Q. When did Coryell leave?—A. He was on the work, still, when I left it, and was on a good while afterwards.

Q. How did he turn out during your time?—A. He did very good service. He was not in every respect satisfactory.

Q. In what respect was he unsatisfactory?—A. Well, he was very much addicted to drink.

Q. But you think he had skill when he was sober?—A. Yes, sir.

Q. And integrity?—A. Yes, sir.

Q. His real failing, then, was the one you have named?—A. Yes, sir.

Q. Was Lucas there when you went on?—A. No, sir.

Q. How did he get employment?—A. I employed him. I employed him first on laying the large main, as a foreman over the men; and I got to know him there, and when the brick masonry lining was going on I employed him for that work as inspector.

Q. In what year did you employ him on the main?—A. I think he laid the main in 1884.

Q. On whose recommendation did you employ him then?—A. I don't know that he had any recommendation. He probably had papers which he submitted, but just what they were I don't know now. He was not employed as inspector. He was employed as a foreman over the men in laying the pipes at that time, and was a very faithful man and did his work very well.

Q. There was an inspector over him?—A. Yes, sir; a superintendent. That work was done by day's labor; not by contract.

Q. He was, then, only a foreman of laborers?—A. Yes, sir.

Q. Did he come directly from that work to the tunnel work as inspector?—A. I don't think he went directly.

Q. You had no new recommendations whatever of Lucas; it was merely what you had known of him as foreman of the laborers?—A. Yes, sir.

Q. And so you did not employ him under the influence of any other person's recommendation at that time?—A. No, sir.

Q. Was Lucas in charge as an inspector while the lining was done which was done in your time?—A. Part of it; yes, sir. He was in charge of the lining of the east shaft, and afterwards in certain portions of the tunnel; just where, I don't know.

Q. Did he make daily reports to you?—A. I don't think the masonry inspectors made daily reports.

Q. Did he make weekly reports?—A. I don't think they made any written reports at all. That is a matter which I can't remember now. I know we had daily reports, but those reports were chiefly made, and I think entirely made by certain general inspectors, who reported on the progress of the work in the headings, and the progress of the lining, etc., and the measurements of the tunnel.

Q. Who were those general inspectors?—A. They were Mr. Woodward and Mr. Tarbell, who were on almost from the beginning of the tunnel.

Q. Lucas's position as inspector of masonry would require him to do what?—A. It would require him to see that the materials that were put into the masonry were proper and that the work was properly done in every respect; that the bricks were properly laid in full beds of mortar, and that the packing was put in well, leaving no voids.

Q. That is, put in according to contract, I suppose?—A. Yes, sir.

Q. The dry packing was to be solid, was it not?—A. Yes, sir.

Q. Did Lucas ever report to you during your time any defect in the manner of putting in the packing?—A. No defect that could not be and was not immediately remedied.

Q. That is not the question. The question is whether he ever reported to you any defect.—A. I don't remember, sir.

Q. You do not remember that he did?—A. No, sir.

Q. You have no recollection on the subject either way?—A. No, sir. I can only say this: Whatever defects he reported would be such as could be instantly remedied, and not be a matter of record. I don't think there was anything.

Q. If he reported—but you say you don't remember that he reported anything?—A. I don't remember he reported anything.

Q. But if he had reported, and if the defects had been of a character that could be easily remedied they would have been?—A. Yes, sir.

Q. About what length of this lining that was put in in your time is there that was put in under the superintendence and inspection of Lucas?—A. I couldn't tell you, sir.

Q. Would your office papers show it?—A. I think they would, sir.

Q. I don't know whether I asked you before whether you had any information as to any defects in the packing that you now remember, or whether you saw any packing yourself except as regards that dome we have already spoken of?—A. I didn't see any. I visited the tunnel just as often as I could; very often; and endeavored by every means in my power to see that the work was well done. I had constant conversation with the men and the inspectors, and I certainly did not pass over anything of that kind that could be remedied.

Q. Do you remember now having received any information from the inspectors or anybody else of any defective packing?—A. No, sir.

Q. Was any report made to the Chief of Engineers when the change of plan was made?—A. That was before my time; but my recollection is that there were reports and papers. In fact I think some of them were published in the annual reports specifying the means that were taken to ascertain about the rocks, etc.

By Mr. RYAN:

Q. I think that you did state, in a general way, that you understood that this change of plan was approved provisionally?—A. Yes, sir.

Q. Upon the condition that solid rock would be found through which a tunnel could be driven requiring no lining?—A. Yes, sir.

Q. Those were the conditions upon which the change of plans was approved?—A. That was a preliminary.

Q. Was that a fact?—A. That was a fact as far as I can tell.

Q. And because such a tunnel would be as inexpensive as either of the other plans considered?—A. Yes, sir.

Q. How many feet of this tunnel had been excavated when it became apparent to you that the tunnel would have to be lined?—A. It was never apparent to me that the whole tunnel would have to be lined.

Q. Well, part of it?—A. It became apparent in a very short time that portions of it would have to be lined.

Q. If it would have to be lined, that would change the condition, would it not?—A. Yes, sir.

Q. That would make it far more expensive, would it not?—A. Yes, sir.

Q. As a matter of fact how much has the lining of the entire tunnel cost the Government?—A. I couldn't tell you.

Q. Can you approximate it?—A. Oh, I suppose it has cost, and will cost, $400,000 or $500,000.

Q. About how much of that tunnel do you think had been excavated when it first became apparent to you that there must be some lining?—A. When we started the tunnel in the Foundry-Branch shaft and the Rock Creek shaft both, we drove that tunnel for a good many hundred feet before we discovered that there would be any lining required at all, and then it was only evident that it would have to be lined in very small part. From Champlain avenue I never thought we would have to line much of it.

Q. Let me ask you this question: How much had been excavated of the tunnel when it became apparent to you that much of it must be lined?—A. I think I can answer generally that the tunnel was half excavated before it was apparent that there would have to be a great deal of expense for lining.

Q. Was that fact reported then to the Chief of Engineers?—A. I had no communication with the Chief of Engineers. I don't know whether it was or not.

Q. Who was it your duty to report it to?—A. To Major Lydecker.

Q. Did you report that fact to Major Lydecker?—A. Not formally; no, sir; I did not make it a subject of any special report. Major Lydecker knew what was going on by our conversations, etc.

Q. Do you know of any report of that change of condition at that time or at any time having been made to the Chief of Engineers?—A. No, sir.

Q. So that, so far as you know, official notice was not given?—A. No, sir.

Q. Of that change of condition?—A. No, sir.

Q. And of the extraordinary loss that would be involved in lining?—A. No, sir.

Q. Why was it not done if the plan was simply approved by the Chief of Engineers conditionally?—A. I meant to explain further, when I started out, that that plan was approved conditionally upon the officers in charge satisfying themselves that there was good rock all the way. After making these explorations for rock and finding it, the fact was formally reported to the Chief of Engineers, that in Major Lydecker's opinion—he was the responsible officer—this rock existed all the way.

By the CHAIRMAN:

Q. That is, good rock?—A. Good rock.

Q. That would not require lining?—A. That would not require lining. This was formally reported to the Chief of Engineers, and then he formally approved the plan.

By Mr. RYAN:

Q. When it was ascertained that the rock was not solid and would require lining, incurring this extraordinary expense, would it not have been proper on your part or on Major Lydecker's part to call the attention of the Chief of Engineers to that fact?—A. I think it would have been a very proper thing to do. Major Lydecker did each month make a report to the Chief of Engineers, but I don't think he ever formally called his attention to it. There is another consideration that may have had effect: Nobody could tell how far and how great a distance this lining would have to be put in, in the unexplored portions of the rock.

Q. But after one-half of the tunnel had been excavated it was appa-

rent to you that it must be lined at very great cost?—A. After half of the tunnel was excavated, the first half of the tunnel that was excavated, it was apparent to me that over one-fifth of it would have to be lined.

By the CHAIRMAN:

Q. Although that half was in eight or nine different places, taking the drift both ways.—A. Yes, sir.

Q. And covering certain sections of the whole length?—A. Yes, sir. I never have believed, if you will allow me to state it, that some parts of the tunnel require lining now, if you get good rock. There may have been developments since I left which would make my views not conclusive in the matter. My own mind might be changed if I should go and examine it; but there is a great deal of this rock which at first was very hard, and apparently there would be no necessity for lining, but which on exposure to the air and moisture disintegrated in such a way as to render it probably unsafe.

Q. As you were going on with the work in this rock it appeared to be so solid that it would not require lining?—A. Yes, sir.

Q. And then after a lapse of time the air and the moisture would have such an effect upon it as to disintegrate it?—A. Yes, sir; after a lapse of several months; so that it was not a thing to be learned even when we were first driving through the rock, that it would require lining. It was a thing to be learned afterwards; in a great many cases months after the tunnel was driven.

By Mr. RYAN:

Q. But the disintegrated character of the rock became apparent to you, at least in many places, before one-half of the tunnel was excavated?—A. That there would be more or less lining required; yes, sir.

Q. Did you not think it would have been proper to call the attention of the Chief of Engineers to that fact—the fact that it would require this lining, which was not contemplated, and therefore this additional cost would be incurred? Did you not think it would have been a proper thing to have called the attention of the Secretary of War or the Chief of Engineers to that fact?—A. I should think so.

Q. But it was not done?—A. No, sir.

By Mr. MCMILLIN:

Q. In one of your communications to the contractors, if I remember correctly, you stated that the unnecessary excavations they were making would have to be packed or filled at their own expense?—A. Yes, sir.

Q. As a matter of fact was any deduction ever made on that account? Were they not paid for all the packing that they did?—A. All that has been lined and packed since I left the tunnel I know nothing about.

Q. There was no lining and packing while you were there?—A. There was lining and packing while I was there; but not in those portions.

Q. Was this dome excavated before you left there?—A. Yes, sir.

Q. Was not that in excess of the requirement of the contract as regards the space blasted out?—A. Yes, sir.

Q. Was any deduction made on account of the excessive filling or packing required there?—A. They were only paid for the stone that they actually put in there; not for filling it up with stone.

Q. By reason of the excavation, more stone, if I understood you correctly in your early examination, was used than would have been if they had made the tunnel the size the specifications required; several

feet more of packing.—A. They were paid for all; all the packing that they put in.

Q. Then they had to put in more than they would have put in at that point if there had been only the excavation required for the tunnel?—A. Yes, sir; but that is not a thing that is involved in that letter that I wrote to them.

Q. I am only asking you about it. You answered my original inquiry by saying that there had been no excessive packing done under your administration. Now I call your attention specifically to that, to show you that you are probably in error because of oversight.—A. We do not understand each other, then. There is a clause in the contract which allows them to be paid a fair compensation for rock which falls and they have to excavate, due to seams and other unavoidable causes. Now for all that rock excavated we paid them for the excavation.

Q. Does not the excavation of a larger space than is necessary make more probable the falling from the roof?—A. Yes, sir.

Q. And if such a falling occurred, then it would be their fault?—A. Yes, sir; if it could be shown to be due to that.

Q. Suppose it was because of the excessive use of explosives, excessive charges of powder. Would not that be due and chargeable to them, instead of charging the Government for the excessive packing?—A. If it could be shown——

Q. I say *if that were the case?*—A. If it could be shown to be due to excessive charges; yes, sir.

Q. As a matter of fact there were complaints of excessive charges of explosives?—A. Yes, sir.

Q. Those complaints were well founded at the time?—A. Yes, sir. That is a matter of judgment.

Q. But your judgment at the time was that the complaints were well founded.—A. Yes, sir.

Q. As to this same dome filling; you say it was expected to be temporary?—A. That was an exceedingly dangerous place.

Q. But you answered originally that you expected it to be temporary?—A. I expected whatever there was put in there would remain, but must be strengthened afterwards. That was always my idea.

Q. You expected it to be strengthened when you packed on each side of it and filled it up to the brick work?—A. Yes, sir; and I have had a plan to fix that. It was one that was also suggested by the Board of Engineers.

Q. If that was only temporary, and whatever packing was put in would be an obstruction when you came to repack it, why was any packing used there until the plans to be adopted were to be carried out in full, in view of the fact that the scaffolding put in there, or the braces, were already sufficient to keep the roof from falling in on the workmen?—A. They were not sufficient to insure it, because that wood rots very rapidly when it is exposed to the air. My idea in remedying that defect was to bore a drill-hole down from the top and flood that with a grout of cement and sand and gravel and fill all the interstices; make that perfectly water-tight.

By the CHAIRMAN:

Q. What diameter would you have your hole?—A. It need not be more than 3 or 4 inches.

Q. What depth would it have to go?—A. It would have to go about 100 feet, I think.

By Mr. McMILLIN:

Q. It would be a pretty watery cement that could be put down through there, would it not?—A. Yes, sir; it would be pretty watery; but the water would drain off, and leave the cement and sand and gravel, filling all the interstices.

Q. To recur to the derelictions of these contractors. You say one of your complaints was that they used insufficient power and insufficient carts, and did not have enough carts to carry off their débris?—A. I think that was one of the complaints; yes, sir.

Q. Did you not regard their failure to supply them as a breach of the contract?—A. Not if they remedied it.

Q. But you complained that they did not have them, and that the work was retarded on that account?—A. Yes, sir.

Q. That being so, was it not a breach of their contract?—A. It might be; yes, sir. I suppose it could be considered under a strict interpretation of their contract as a breach. They did things no doubt that under a very strict interpretation would justify the annulment of their contract; but it was a matter which had to be looked at whether there would be anything gained.

Q. I am not asking as to the gain. That is a matter for future consideration.—A. There were some things.

By the CHAIRMAN:

Q. Can you tell in round numbers what was the original estimate as it had been modified for the cost of this tunnel at the time you came on the work?—A. The estimated cost of the tunnel was supposed to be within the limit of the appropriation for it.

Q. The appropriation by the act of 1882?—A. Yes, sir.

Q. Can you tell what the estimated cost of it was for the total completion, including the former estimate and appropriation, when you left the work?—A. Yes, sir. My estimate was $395,000 in excess of the original appropriation.

Q. The original appropriation was $599,534.50?—A. Yes, sir.

Q. And your estimate was $395,000 additional?—A. Yes, sir. That was based upon dry-stone packing and upon lining the portions of the tunnel I at that time deemed necessary to line so far as we could ascertain.

Q. So that, from what you had learned in the course of the time you were there, the estimated expense had risen from $600,000 to $395,000 more?—A. Yes, sir.

Q. That is in round numbers two-thirds of the amount of the whole preceding estimate?—A. Yes, sir. I will say that until I went to work on that estimate I gave very little attention to the finances. My position was simply superintending engineer, and the financial part I had nothing whatever to do with.

Q. Your estimate of $395,000 additional of course was an official estimate and appears in the prints, does it not?—A. Yes, sir. There is another thing about the rate of progress complained of: while we continually tried to hurry them up it was more particularly to get them to work faster on the two headings which would be the longest in driving. About the others there was no particular hurry, because they would get through any way, even if they made half progress.

Q. You addressed your complaint to that subject, did you not?—A. Yes, sir.

Q. So that that result was in your mind?—A. Yes, sir.

TESTIMONY OF JOHN V. QUACKENBUSH.

WEDNESDAY, *November* 28, 1888.

JOHN V. QUACKENBUSH, sworn and examined.

By the CHAIRMAN:

Q. Where do you reside?—A. I reside part of the time in Washington. When I am at home I live in Herkimer County, Mohawk.

Q. Mohawk is your post-office address?—A. Yes, sir.

Q. Your residence while in Washington is where?—A. 2925 M street, Georgetown.

Q. What is your age?—A. I was born in 1833.

Q. You are fifty-five, then?—A. Yes, sir.

Q. What is your occupation?—A. Contractor.

Q. Contractor as to what?—A. I have followed all kinds of contracting—masonry, earthwork, railroad work, and water-works.

Q. You are one of the firm of Beckwith & Quackenbush?—A. Yes, sir.

Q. Who had the contract in 1883, I think it was, for the Washington Aqueduct tunnel?—A. Yes, sir.

Q. What tunnel work had your firm done before you entered upon this contract?—A. I have done tunnel work in California.

Q. How long ago?—A. That was in 1857 and 1858.

Q. Have you done any tunnel work since, until this?—A. We did some tunnel work in Boston. We did not do the excavation. We did the lining of some tunnels there for the city of Boston.

Q. When was that?—A. I can't recollect exactly the date. I think we came away from there—it must have been somewhere in 1875.

Q. Did you do any tunnel work afterwards until you did this?—A. No, sir.

Q. Who were your partners besides Mr. Beckwith, if anybody, in this work?—A. Charles Peterson.

Q. He does not appear in the contract, does he?—A. No, sir. We are the only parties that appear in the contract.

Q. Has Peterson been here to have anything to do with the work?—A. No, sir.

Q. Where does he live?—A. He lives at Lockport; he is the son of Gilbert Peterson, the man that did the work on the reservoir.

Q. Why did not Peterson appear in the contract, if he was one of the partners?—A. I don't know. We have been interested, backward and forward, at different times, and when we took the contract he was not in it, but we were interested in other work with him in Buffalo, on the West Shore; and after we made the contract we asked him if he wanted an interest in it, and he said he did. I don't know but we spoke to him before we got to work. I will not be positive as to that; but we came to a decision after we got the work.

Q. What was the extent of his interest in it?—A. His interest is one-eighth.

Q. Have you any other partner besides him?—A. We have some silent partners; yes, sir.

Q. Name them.—A. H. D. Alexander and Floyd Shepherd.

Q. Where does Alexander live?—A. He is the president of the Mohawk Valley Bank, at Mohawk.

Q. Where does Floyd Shepherd live?—A. He lives in Ilion.

Q. Ilion, N. Y.?—A. Yes, sir.

Q. What is the extent of the interest of the silent partners?—A. The interest is divided between them equally and Beckwith and myself. You can figure that interest, taking Mr. Peterson's one-eighth out.

Q. They, together with you and Mr. Beckwith, have a seven-eighths interest?—A. They have a share, you will understand, providing there is anything made in it. They run no risk and take no chances. We were obliged to do that in order to get our bondsmen.

Q. Are these arrangements between yourself, Beckwith, Peterson, Alexander, and Shepherd in writing?—A. Mr. Alexander has. We have no copy of it.

Q. Has he a paper signed by you all?—A. I don't think it is signed by Mr. Peterson.

Q. But signed by you and Beckwith and Alexander and Shepherd?—A. I think so; yes, if I recollect right.

Q. What are Alexander and Shepherd to do in order to obtain a share of the profits?—A. They furnish the bondsmen; that is all.

Q. Who are the bondsmen?—A. Well, there is Philo Remington, Floyd Shepherd, H. D. Alexander, H. A. Deimal, and Daniel Canda.

Q. When you put in these proposals on which the contract was awarded to you, were you present at the opening of the bids?—A. No, sir.

Q. Was anybody representing your association present?—A. No, sir.

Q. How did you first know that the contract had been awarded to you?—A. By letter.

Q. From whom?—A. I couldn't say whether it was from Captain Hoxie or Major Lydecker; I think from Captain Hoxie.

Q. How soon after that did you come to Washington?—A. Mr. Beckwith came, I think, the next day or two after we were notified. In the first place we received a letter.

Q. That was in May, 1883, was it not?—A. I think it was in the fall some time. I think it was in October. We commenced work in December, and I think it must have been in October some time.

Q. The proposal I see is dated the 1st of October, 1883. Mr. Beckwith came on first, did he?—A. Yes, sir.

Q. Has he had charge of the work at all?—A. He has been here; yes, sir. He was here, I think, the first two years. He went away about two years ago, I believe. He had some interests in New York he was looking after.

Q. Did you have any plant at the time your proposals were made suitable to do the work?—A. Yes, sir.

Q. What was it?—A. We started all our work——

Q. I say when you made the proposal.—A. Yes, sir.

Q. On the 1st of October, 1883?—A. Yes, sir; we had engines and derricks and everything of that kind.

Q. Where were they?—A. They were in Mohawk in a store-house that we have. We did all our sinking with that plant.

Q. How soon did you come on to Washington yourself?—A. I couldn't tell the date.

Q. About what time?—A. I came on in November some time; the very last of November. I was there when we started the work, and that was December 10, 11, or 12. We started our shafts, I think, the 12th of December.

Q. Did you at that time, before you commenced the work and after you made the proposal, have any knowledge or information concerning

other bids?—A. Yes, sir; that is, all the information we had we saw in the papers.

Q. Did you have any communication or conversation with anybody concerning these two other bids that on the face of the papers would seem to have been lower than yours?—A. No, sir. Let me state here that we received a letter I think before the work was awarded, to know whether we had agreed in any shape with Dewees & Co. to furnish them the plant to start the work. I think we received a letter to that effect. That is my recollection.

Q. What did you state in reply?—A. That we never had met them; that we did not know the parties at all.

Q. Did you know them afterwards?—A. Oh, I have met Mr. Dewees here since I have been here, a number of times.

Q. Do you know where his home is?—A. No, sir; I know nothing of it.

Q. Did you have any other communication or information, either oral or in writing, concerning the other bids, or any question about them or yours until after the contract was signed?—A. Not any, sir; only we were looking up the work. We never met anybody here, I think, but Captain Hoxie.

Q. Then, if I understand you correctly, you had nothing to do, directly or indirectly, with any question about the relative advantage of the bids to the Government?—A. I know nothing about it at all, sir.

Q. Did you do anything about it or say anything about it?—A. No, sir.

Q. Who was your superintendent when you first began the work, if you had one?—A. William Noe.

Q. Where does he reside now?—A. I couldn't say.

Q. How long was he employed by you?—A. He came on with us here. He was in our employ; he was an old tunnel man and came on with us. We had been at work then on the West Shore, building the West Shore.

Q. How long was he with you here on this work?—A. I couldn't tell you just the time.

Q. About how long?—A. Oh, I should think he was here a year and a half, may be two years.

Q. During that time was he the superintendent?—A. Well, he was not all the time the superintendent; that is, he was the superintendent on part of the work all the time, and then we had another man by the name of Douglas that was superintendent.

Q. What was his first name?—A. I think his name was A. C. Douglas. There were two brothers; one of them was J. W. and the other A. C., and I wouldn't be positive which was superintendent.

Q. Do you know his place of residence?—A. No; but they do at the office. We have it on the book. We have a record of all the men that have worked for us on the work.

Q. At your office here at Washington?—A. Yes, sir; 2925 M street.

Q. Have you all the books and papers relating to the matter at your office?—A. I think so.

Q. Who was the next person in authority under these superintendents?—A. There was another one of these Douglases took Mr. Noe's place when he resigned.

Q. Yes; but while Noe was here for the year and a half or two years, who was the next person under him in charge?—A. Patrick Haley.

Q. Where does he live?—A. He lives here in Washington.

Q. Do you know his street and number?—A. No; but a letter will fetch him right to our office. He is at work for us still. He commenced when we commenced on the work, and he has been there constantly.

Q. What were his duties?—A. He was, in the first place, foreman, what we call shift-boss, sinking the shaft. He made his regular work in one of the shafts, and he has been here constantly.

Q. He had charge of sinking the shafts and carrying the drifts from the headings?—A. Yes, sir; he has been superintendent now for the last two years.

Q. Since he has been superintendent who has been foreman?—A. We have had many different ones. They are constantly changing.

Q. They will all appear on your book?—A. Yes, sir.

Q. With the times when they were employed?—A. Yes, sir.

Q. I suppose you fully understood the contract when you signed it?—A. I thought I did. I meant to; yes, sir.

Q. Did you go on as fast as the contract called for?—A. No, sir.

Q. How did that happen?—A. I should like to have you tell me whether you are now referring to the excavation.

Q. I am now asking about the excavation. We will go to the lining later on.—A. No, sir; we did not.

Q. How did it happen?—A. The rock was so much harder, and then we found that the plan of the shaft was too small; that we couldn't keep them up away from the heading on account of the muck. What we call the muck is broken stone.

Q. Was that the only reason you did not get on?—A. On account of the rock being so hard.

Q. And on account of the shaft?—A. Keeping the tunnel free of muck. It would take us—it would delay the work materially on that account, and also on account of the appropriation we were delayed.

Q. Was there anything else that delayed the work except the smallness of the shaft that you have spoken of and the hardness of the rock?—A. Nothing that I remember of; only the appropriation. That delayed the progress of course.

Q. You do not remember anything else?—A. No, sir.

Q. Were you here frequently from time to time while Beckwith was here?—A. I was here all the time.

Q. You had the actual administrative charge of carrying on the work, had you?—A. I generally took charge of it; yes, sir.

Q. Were the shafts that you now speak of as being too small to admit your getting up the muck fast enough of the same size as appeared in the drawings, and so forth, that were submitted to you as a part of the contract?—A. Yes, sir.

Q. How did it happen then that you so miscalculated your ability to do what you had engaged to do?—A. I said on account of the rock being so much different from what we expected.

Q. It was on account of the hardness of the rock?—A. Yes, sir.

Q. But when you got to the muck it was a question of the size of the shaft?—A. Yes, sir; that was on account of the shaft. In some places where the muck was softer we had no trouble; our only trouble was in removing the rock as fast as we could loosen it.

Q. Why could you not remove the hard rock as fast as you could the soft rock?—A. It took so much longer to do it; it would take us thirty hours to get around the holes in the hard rock, and in the soft we could get around the holes sometimes in three, or four, or five hours.

Q. That is a question of excavation?—A. Yes, sir.

Q. I am now talking about the question of getting out the muck.—A.

In the soft rock—there was the trouble. In the hard rock we had lots of time to get it out.

Q. In the soft rock you could carry your excavation faster than you could get out the muck?—A. Yes, sir.

Q. You did not anticipate this soft rock?—A. We anticipated a rock, certainly, that was soft, or else we would have wanted more for doing the excavation; because some of this rock cost us $15 or $18 a yard to get it out, and others we did for $3 or $4.

Q. Have you stated all that you consider to have been the cause of the delay in the excavation?—A. Yes, sir; I think so. I don't claim that my memory can remember all the causes.

Q. Was not your attention quite often called by the engineer in charge to the fact, as he alleged, that your force was not rightly managed; that you were not employing force enough; that you did not have carts enough, and that your compressed-air pumping machinery was not nearly up to the requirement, and so forth?—A. No, sir; we put in the machinery just exactly as they said we should put it in. The trouble was in the machinery. Our machinery was not located properly. It was Captain Hoxie's idea to have a central plant, and there was so much loss in the transmission of air that it was a great expense to us; but we never received any notice in regard to machinery not being ample, so far as I can remember. That was one of the points we labored under when we came to very hard rock; the loss in the transmission of the air.

Q. What was your original plan as to furnishing the power?—A. You understand, we had no experience in air, and we only took the advice of experts in regard to that. Captain Hoxie's idea seemed to be to have a central plant. He thought that would be beneficial. That was his idea. Our information that we got was, we would have no loss in the transmission of the air. When we came to put the thing in practice we found we would. We would have 60 and 80 pounds of air at the compressor, and we would have 20 pounds less when we did the work; say 80 pounds at the compressor, and we would only have 60 pounds at the shaft.

Q. What was the length of pipe from the compressor to the shaft?—A. The whole length of the pipe was something over 5 miles, the line that we run.

Q. What was the shortest distance from the compressor, by pipe, to the nearest place where you used compressed air?—A. I could not say, but I think it was close to a mile, any way.

Q. How much would the pressure diminish at the end of that mile?—A. Twelve pounds. That would be the best that we had.

Q. What kind of power did you contemplate using when you entered into the contract?—A. We contemplated using this air; but we contemplated putting our compressors at each shaft.

Q. Was there anything in the contract which prevented you from doing that?—A. No, sir; we only done it for the satisfaction of the gentleman in charge. That was all. It was his advice. He had made a study of it, and thinking it would be beneficial to the work we took his advice. Captain Hoxie, I should consider, was a man of good judgment, and we don't wish to find any fault or to make any complaint of anybody.

Q. You were not required in the sense of any command from him to adopt this practice or plan?—A. No, sir.

Q. You rested on his advice as that of a citizen who knew, as you supposed, the best way of doing it?—A. Yes, sir; and by putting this

plant in it cost us $26,000 more than it would if we had located there just for pipe alone.

Q. You would have furnished your power for compressing by steam at the various shafts, I suppose?—A. Yes, sir.

Q. What do you remember, if anything, about your getting out of line; getting below the grade required by the drawings and so forth, or getting to the right or to the left?—A. Well, that was on account of the engineers not giving us the line.

Q. Did the contract require the engineer to give you the line?—A. Oh, certainly.

Q. Did you ever employ an engineer yourself?—A. We did; yes, sir; but it was something that we never had heard of or thought of before; in all the contracting we had ever done we never were known to furnish our own engineer.

Q. You had the plans and drawings referred to in the contract, I suppose?—A. We had no drawings. We had plans. I will say here I never got off the line after we had an engineer, and never got off the grade.

Q. You say your understanding of the contract was that the United States engineer should furnish the daily lines, or as often as it should be necessary for the actual work of the tunnel?—A. Oh, yes, sir.

Q. And do the administrative engineering which was necessary to enable you to follow the intended line?—A. Oh, yes, sir; by all means.

Q. Did you get off from the line?—A. Yes, sir.

Q. Was any complaint made about it?—A. Yes, sir.

Q. What was your reply in substance?—A. In the first place I would have to state the number of engineers. They had a number of engineers in giving the line of the tunnel. Mr. Partridge was the first one; Mr. Merrill was the second one. We ran according to the line of Mr. Partridge in the first place, and then Mr. Merrill came down and ran the line and it didn't correspond with Mr. Partridge's. Then they afterwards hired Mr. Coryell, and he ran the line and his line showed that the line we had followed that Mr. Partridge had given us was off entirely. We had to make a short elbow in Champlain avenue to get back on the line. In regard to grade they made us go down; we changed our grade in Champlain avenue west either twice or three times; we had to cut down some 800 or 900 feet in length, and I think the deepest excavation must have been between 5 and 6 feet. Those were all delays in regard to the progress that I didn't think of at the time you asked me; but when I commence at the beginning, it all comes back to me.

Q. How did that cause delay?—A. Interfering with the progress of the work. You can't go to work and take up the bottom and at the same time go along over the track, because you have got to tear up the track.

Q. Did you make that change for 800 or 900 feet in raising the grade or lowering it?—A. Yes, sir; when Mr. Coryell come in he ordered it and we had to do it; certainly.

By Mr. RYAN:

Q. The grade was fixed by the engineer in charge?—A. Yes, sir.

By the CHAIRMAN:

Q. That made the height of the excavation, then, 5 or 6 feet more than it needed to be?—A. Oh, yes, sir. Let me qualify that. In the original calculation they did not mean to put in masonry. It wouldn't make it that much higher where they excavated for masonry. We were com-

pelled in the first case to excavate the normal section, and afterwards go back and trim for masonry, and that was another delay. If they had let us take it out the size in the first place for masonry, we could have got along much faster.

Q. Did your contract authorize you to make the excavation complete for masonry as you went along?—A. Oh, no. We were subject to the orders of the engineer in charge of the work.

Q. Did you expect when you made the contract that you were going to make a drift through of the normal size?—A. Originally. The original calculation of Captain Hoxie was, that there was not to be any lining.

Q. How far did you go in your excavation before that calculation was made?—A. We went till we come to the soft strata of rock that they knew wouldn't stand; that the tunnel must fall in.

Q. How soon was that?—A. If you will allow me to refresh my memory from some minutes I took from the book, I can tell.

Q. Certainly; do so.—A. The first brick-work was done in the shaft December 10, 1884. We commenced lining the tunnel in the west shaft February 16, 1887.

Q. My question really was when you first discovered or learned that this normal drift, which was not to require excavation for masonry, but was to go through that way, appeared to be such that you would have to line it. How far had you got?—A. I couldn't say how far in Howard University. I know we were not over 150 feet or 200 feet, anyway, before we became positive it ought to be lined.

Q. Did you then begin to enlarge the excavation from the normal size of the tunnel?—A. No, sir; they wouldn't let us do that. The Government said it was economy to make us go through the normal size and then come back and trim.

Q. Did you do that all the way?—A. Not all the way; no, sir.

Q. How far did you go before you began to excavate entirely?—A. I couldn't say. We certainly done three-quarters of our work normal size.

Q. Is this the clause in the contract you referred to as to its being the duty of the United States engineers to furnish you the line from day to day? I read from page 4 of the printed copy, under the heading of cross-sections of tunnel:

The cross-sections of tunnel will be rectangular, 11 feet wide by 7½ feet in height, except where lining is required, when the cross-section of excavation will be increased to such limit as the United States engineers shall indicate. In all cases the prescribed sections must be preserved and no payment will be made for material excavated outside of the specified lines and grades.

Is that the clause that you referred to?—A. Yes, sir.

Q. Did you not have on paper by way of specification or drawing or profile any indication, when you made this contract, of how deep you were to go into the ground and where you were to go?—A. Yes, sir; we had something of that kind. I think it is in that specification. It tells what the shaft shall be; each shaft.

Q. Yes; it tells also what the cross section is to be; but I do not see anything here in the specification which states the depth and the direction?—A. I think it says the shafts are to be more or less.

Q. But my question is whether you did not have in your possession from the engineers, in connection with this work, when you began the work, papers and drawings which showed exactly what you were to do; how deep you were to go into the ground; and having got down to the bottom of the shaft, where you were to go with this 11 by 7½ foot exca-

vation?—A. No, sir; they came there and would examine the rock themselves, Captain Simons would, to see whether it was suitable, and they were to decide that.

Q. My question was whether you had no papers of the kind I have indicated?—A. No, sir; I think not.

Q. Did you ever have any?—A. I don't think we did; not to my recollection.

Q. If you are correct about that then it would require the attendance of some engineer every day to tell you in what direction to go and what grade you should keep on?—A. Yes, sir.

Q. If you had nothing on paper to guide you, then you would not know what to do if you had been an engineer yourself?—A. No, sir.

Q. Now we will go back to what we were speaking of previously; that is, how far you had got into this work when it was discovered that it would be necessary to provide for masonry.—A. I wouldn't say positively, but I think it may have been 250 feet in Howard University, before we got to soft rock.

Q. How far did you go in point of distance before you began to excavate to the full size for masonry lining?

The WITNESS. What distance from the shaft?

The CHAIRMAN. Yes.

The WITNESS. I think we put in timbers 250 feet at Howard University. I think we put them in there, where the rock was very soft, to put in lining.

Q. And there the excavation was larger than 11 by 7½ feet?—A. Yes, sir.

Q. When you had got by that soft place did you go back to the dimensions of 11 by 7½ feet again?—A. Yes, sir. In some places we would run 25 feet through a soft streak and then go back; and in some places 50 feet.

Q. How near to the normal size did you get? You say you did a great deal of the work so that you had to go back and trim. When you did your work on the normal size, how near did you come to that?—A. We always excavated outside of that.

Q. How much?—A. Our measurements show it is about a yard and a half. In order to get the right dimension so that we wouldn't have to retrim it, it necessitated us to cut out about a yard and a half more. If we had had any projections in there, they would have made us blast or point them out. It averaged, I think, about a yard and a half.

Q. A cubic yard and a half?—A. Yes, sir.

Q. Taking the whole circle of the tunnel?—A. Yes, sir.

Q. What would be the actual size, then, where 11 feet in width was called for; how wide would it be?—A. Well, if you want that information you will have to subpœna our engineer, because I couldn't give it to you exactly. He has got the cross sections taken very often, with all the papers and everything. He could give it to you correctly.

Q. What is your engineer's name?—A. Clark.

Q. What is his first name?—A. Frank.

Q. Where does he live?—A. He is over in our office.

Q. What is his residence?—A. 2925 M street.

Q. When did you employ him?—A. I think about a year and a half or two years ago.

Q. What were his duties?—A. His duties were to take the cross sections and look after the masonry and give us the amount of progress that they were making, both in the masonry and also in the excavation, and to give the grade and line.

Q. Was he the first engineer that you had?—A. No, sir; we had a man by the name of Porter. When we got the order from the office that we must furnish an engineer I think we had Porter for the first man.

Q. Before you got that order that you must furnish an engineer you had none?—A. No, sir.

Q. Down to that time you had proceeded upon the daily surveys of the Government engineers—daily, weekly, or whatever they were—all that were made?—A. All that were made; yes, sir.

Q. Can you tell us, now, when you were first notified that you would have to provide for extensive concrete lining?—A. We never were notified in regard to concrete lining.

Q. Did you ever put any in?—A. No, sir; it was all brick lining.

Q. Has nobody ever put any in?—A. No, sir.

Q. There is no concrete lining there at all?—A. No, sir; there is no concrete lining. There is concrete in the bottom to put the invert in, but that we don't call lining.

Q. All the lining that there is is masonry, is it?—A. Brick masonry; yes, sir.

Q. Is there any stone-masonry lining?—A. There is stone packing; there is side walls.

Q. Are there any stone side walls?—A. Yes, sir.

Q. They coincide with the brick lining?—A. Yes, sir.

Q. And therefore make a part of the total lining of the tunnel?—A. Yes, sir.

Q. How high do those stone side walls come up ordinarily?—A. Four or five feet.

Q. Do they extend all the way through as far as the brick masonry has gone?—A. In this last contract that we had with the Government. You understand that we had received our final payment on one contract.

Q. I am talking about what we could see if we went there now. You are speaking of stone masonry side walls?—A. Yes, sir.

Q. How extensive were they in point of length?—A. I think there is about 4,000 feet.

Q. Four thousand feet in length of tunnel?—A. Yes, sir.

Q. A wall on each side?—A. Yes, sir.

Q. And on top of that the brick masonry lining?—A. Yes, sir.

Q. Is there any brick masonry lining that goes clear down to the bottom of the tunnel, and does not rest on stone side walls?—A. Oh, yes, sir; I think there is about 8,000 feet.

Q. Where it is all brick?—A. All brick lining; yes, sir.

Q. And brick side walls?—A. Yes, sir.

Q. And brick bottom as well, there?—A. Part of the way. It is not all brick bottom. In the very softest places they put in what we call brick invert.

Q. That makes the bottom of the tunnel on which the water is to rest, does it not?—A. Yes, sir.

Q. When did you first see or hear anything in any way of any imperfection in the work of lining and packing; by lining I include the packing as well?—A. I never heard of any fault or complaint made about the lining, but I heard complaint about the packing. I think the first complaint I heard directly from the Government was in July.

Q. What year?—A. This year.

Q. You say the "first complaint you ever heard directly from the Government." My question was when was the first time you ever saw

or heard from anybody anything in regard to any imperfection in packing?—A. I couldn't tell just the time, because sometimes there might be a complaint made to our men, or they would hear of it from the subcontractors—that some packer had not done his work well, and he would be made to take it out and do it over. I wouldn't recollect that; but the official correspondence from the Government I would recollect more particularly. The minor complaints might be made to our men and come from them to me; that some man hadn't done his packing well and had been discharged, or something of that kind. I had heard of those cases, I can't say how often.

Q. When did your superintendent, if ever, first speak to you upon the subject of any defect in packing?—A. The first that he wrote to me——

Q. That is not the question. My question was when he first spoke to you?—A. I couldn't say that.

Q. State as near as you can.—A. I couldn't give you the date.

Q. You can not give any date at all?—A. No, sir; I don't think I can.

Q. Did you ever hear anything about any defective packing from any source while Captain Symons was in charge?—A. No, sir; not to my recollection.

Q. While he was in charge a considerable amount of masonry was laid, was there not, in the way of lining?—A. Well, I think there was between 1,700 and 1,800 yards of dry packing.

Q. That was dry packing?—A. Yes, sir.

Q. During that process of laying 1,700 or 1,800 yards of dry packing. did you ever hear from any source anything concerning any defect or want of proper arrangement about it?—A. Not to my recollection; no, sir.

Q. You were here all the time substantially?—A. I was at that time; yes, sir.

Q. And paying entire attention to that work, I suppose?—A. That was my sole occupation; yes, sir.

Q. I suppose you visited the work very often, did you not?—A. Oh, yes, sir; I used to go into every shaft every day; sometimes twice a day.

Q. And so from day to day you saw this brick masonry lining, 1,700 or 1,800 yards, during the time of Captain Symons, as it was building, I suppose, did you not?—A. I would notice it when I went in, always.

Q. You went in every day or two, and sometimes twice a day?—A. Yes, sir.

Q. And the dry packing was going on at the same time, I suppose?—A. Yes, sir.

Q. Fixing your mind on that part of the work we have now mentioned, can you remember any instance in which any person ever spoke to you or wrote to you upon the subject of that packing or backing?—A. No, sir; I don't recollect of it ever being called to my attention, although it might have been.

Q. You have spoken of subcontractors in one observation you made. Were there subcontractors?—A. Yes, sir.

Q. Who were they?—A. On the first work there was Brennan and Emory.

Q. When did their subcontract begin?—A. March 2, 1885.

Q. Was that before or after this brick masonry and dry packing that we have been last speaking of was put in?—A. Before.

Q. What was the nature of their subcontract?

The WITNESS. Do you mean the prices?

The CHAIRMAN. No; what were they to do?

The WITNESS. They were to do all the masonry and the packing and the concrete.

Q. That contract was in writing, I suppose?—A. Yes, sir. You have not a copy of it?

Q. I merely asked you if the contract was in writing.—A. Yes, sir.

Q. You have it, I suppose?—A. Our Mr. Clark, I think, gave it to the court of inquiry when he was subpœnaed there. I think they have it.

Q. Have you a copy left?—A. I don't think we have.

Q. They were to put in the masonry and the packing?—A. Yes, sir.

Q. The contract, I suppose, required that they should put it in according to the original contract?—A. To the satisfaction and acceptance of the United States engineers.

Q. Did you communicate the fact that you had sublet this masonry and packing work to the Government engineers?—A. I don't know that I did; no, sir.

Q. Why did you not?—A. Well, I didn't think it was necessary. That is the only reason I had.

Q. You may state what you were to pay to these people, Brennan and Emory, for that work.—A. For dry packing they got 75 cents a cubic yard; for brick masonry they got $2.75 a cubic yard; for concrete masonry they got $1.50; that is, for doing the work.

Q. All that was for doing the work?—A. Yes, sir; we furnished all the material except tools. We put the stone as it came from the heading for packing right at their work; selected the stone that was suitable. The bricks they loaded in cars and we lowered them and hauled them into the work. The cement and sand was furnished right at the top of the shaft. They mixed it and sent it down.

Q. And their compensation was what you have stated for doing the things you have named?—A. Yes, sir; that is, for the dry packing. When you come to the other work, it was different.

Q. I am on the dry packing now. Did they have any additional compensation arranged for in any way?—A. No, sir; not that I know of.

Q. That constituted the whole of the agreement?—A. Yes, sir.

Q. Your books, I suppose, show how much you paid them on that account?—A. Yes, sir.

Q. And your engineer's book would show the quantity according to his measurements of that kind of work that they did?—A. Yes, sir. We paid them according to the estimate given us.

Q. You paid them on your engineer's report, I suppose?—A. No, sir; we paid them on the United States engineer's report. We were not estimating on our engineers at all.

Q. Did you employ anybody or have anybody in charge to watch the work of Brennan and Emory?—A. Yes, sir; our superintendent and shift bosses, and time-keepers and all of them were instructed to watch the work and see that the work was done well.

Q. What is a shift boss?—A. The man at the heading.

Q. Did any of those men ever report to you or communicate to you in any way any fault or omission in the work being done under this subcontract?—A. Never.

Q. Confining ourselves for the present to the 1,700 or 1,800 yards of dry packing and lining, have you since that time had any information as to any imperfection in that work?

The WITNESS. Since they have been making the examination?

The CHAIRMAN. From the time it was put in did you ever have any

information of any imperfection, except what has turned out by the testimony in court or the newspapers?

The WITNESS. No, sir; only from what the information now is.

Q. From that information do you now understand that any part of this work of 1,700 or 1,800 yards of dry packing was imperfect?—A. I can't say as to that. Mr. Clark has given me an account of the places that has been cut in it, but I don't remember the places now.

JOHN V. QUACKENBUSH—Recalled.

SATURDAY, *December* 1, 1888.

JOHN V. QUACKENBUSH, recalled and further examined.

(By permission of the committee, Mr. R. Ross Perry was present as attorney for Messrs. Beckwith & Quackenbush.)

By the CHAIRMAN:

Q. Have you brought here your time-book, so that you can tell us what persons were engaged under you in making the tunnel?

The WITNESS. You refer to the time-book of Brennan & Emory, the first subcontractors?

The CHAIRMAN. What have you here?

The WITNESS. Those are the books that are here, and the rest will be here in a very short time.

The CHAIRMAN. Let us have what you have.

The witness produced books numbered, respectively, 1, 2, and 3, No. 1 being labeled on the outside "P. F. Brennan, masonry, March 1, 1885, to February 4, 1886," No. 2 being labeled "P. F. Brennan, February 5 to October 16, 1887," and No. 3 being labeled "P. F. Brennan, time-book, October 16, 1887, to——"

Q. I see by this first time-book that the lining commenced under Brennan & Emory on March 6, 1885, they being the subcontractors for that lining. At that time had the lining been done for those one or two great cavities that you spoke of the other day?—A. I did not speak of any great cavities.

Q. I thought you referred to the first lining that was put in with dry packing when dry packing was the contract thing?—A. I did not speak of any cavities; I do not remember of speaking of them.

Q. Then, tell us now how much dry packing there was put in when the contract called for dry packing, and before any change was made?

The WITNESS. The number of cubic feet?

The CHAIRMAN. The number of linear feet.

The WITNESS. I think somewhere between 1,700 and 1,800 feet.

Q. About when was that 1,700 or 1,800 feet put in?—A. This book gives the time that the lining was commenced in each place; I have a minute of that from the engineer's note-book.

Q. Do you know where there was a place that had a dome-like cavity in which they had put cord-wood and other stuff to hold up the rock, and which was filled with dry packing at a time when dry packing was the proper thing?—A. Yes, sir; that was in Champlain avenue; the first dry packing was commenced at Champlain avenue.

Q. That was the place where this large spot was to which I refer, was it?—A. I think that was at station somewhere about 600 or 700 feet from the mouth of the tunnel; just exactly what time that packing was put in I couldn't say.

Q. Champlain east or west?—A. West Champlain avenue shaft. You are now speaking of what we call the Crow's Nest; we are generally more familiar with it under that name.

Q. When was that commenced? I see it is put down here on the book Champlain avenue east, Friday, March 20, 1885.—A. That was the time we commenced lining.

Q. That is when you commenced there?—A. The first lining that was done in Champlain avenue commenced March 17.

Q. What were those people doing at the west connecting shaft?—A. I think they were lining the tunnel.

Q. And that was dry packing?—A. Yes, sir.

Q. And in all, under the dry-packing system, you did 1,700 or 1,800 feet?—A. In round numbers, in the different places, some in Champlain avenue and some in Howard University.

Q. What time do you think you finished that dry packing work when dry packing was the proper thing to be done under your orders?—A. I couldn't answer; I have no note of that.

Q. State as nearly as you can whether that dry packing work, done according to orders as to its being dry packing, was done under the first contract?—A. That was the intention, and I supposed that all of it was done according to the specifications and contract until it was discovered otherwise.

Q. During that time, when you were dry packing in general in this 1,700 or 1,800 feet, did you do any concrete packing?—A. No concrete packing.

Q. Did you do any concrete lining?—A. There was concrete under the invert, put in under the bottom of the tunnel.

Q. But none on the sides, to fill up cracks, or anything of the kind?—A. I wouldn't be positive about that, but I think not.

Q. It appears from this time-book that the mason in charge on the 6th of March, 1885, at the west connecting shaft, was Thomas McNamara?—A. Yes, sir.

Q. That at the Howard University shaft, for the week ending the 6th of March, 1885, Lorenzo Lucas was the mason in charge, does it not?—A. Yes, sir.

Q. Tell us right there whether that Lorenzo Lucas was the same Lucas who was at one time a Government inspector?—A. I don't know; I don't know his first name.

Q. Did you ever know any other Lucas than this Government inspector?—A. Oh, yes; I know this man Lucas has two sons.

The CHAIRMAN (to Mr. Perry). Whenever you think there is anything you would like to object to, you may say so.

Mr. PERRY. I do not think Mr. Quackenbush has anything to conceal here, Mr. Chairman. I think that, under the decision of the Supreme Court in the case of Kilbourn *vs.* Thompson, his appearance here is voluntary, and his answers, I have instructed him, will cease whenever he does not desire to respond further. With regard to the production of his books, we are willing that the books shall be seen with reference to these contracts. We do not, however, wish to leave them here. So far, nothing has occurred that causes me to desire to interfere with the examination. I am willing that it shall proceed to any limit.

The CHAIRMAN. It is proper to say, in reply to what you have said, Mr. Perry, that we do not, of course, agree to your notion as to his duty to attend and answer or to produce the books relating to this particular public work; but the committee, I take it, has not the slightest disposition to claim or exert any authority to take these books out of

his custody. He only produces these books as a witness, having these records of transactions in his possession, and they are his property. We do not claim that we have any right to retain these books; do we, gentlemen?

Mr. McMILLIN. We do not desire to do so.

Mr. RYAN. I do not suppose there is any object in doing so.

Q. Do you know this Mr. Lorenzo Lucas?—A. No, sir, I do not; not without he is the inspector.

Q. Do you know the inspector Lucas?—A. I know him well, but I never knew his first name; I always called him Lucas.

The CHAIRMAN. In this list of inspectors from November, 1884, to May, 1885, and in August, 1885, appears the name of Thomas Lucas.

Mr. RYAN. Mr. Perry tells me that this Lorenzo Lucas is not the inspector.

The CHAIRMAN. Then in the list of subinspectors the name of Lorenzo A. Lucas appears from March to July, 1885. This Lucas in this time-book is Lorenzo Lucas; there is no middle letter put in. Whether it is the same man or not, we shall have to ascertain. It covers the same period of time. The rate of pay of this Lorenzo Lucas was $5 a day, and the same was paid to McNamara. Then at the west connecting shaft Friday, March 13, for the week ending that day, Thomas McDermott was the mason in charge, as appears from this time-book, was he not?—A. Yes, sir; I suppose that he was.

Q. Then at the Howard University, for the week ending March 13, Harry Bolac was foreman; do you know anything about the residences of these people?—A. I know Bolac's residence; he is here in the city; but these other men I do not know.

Q. You do not know McDermott?—A. No, sir; I may know him by sight, but not by name.

Q. You do not know McNamara?—A. I think he is in the city also; I believe he has been before the court of inquiry.

Q. McDermott's pay was $5 a day as foreman of masons, and Bolac as foreman got $2.50; that was on some other kind of work?—A. I supposed this was all Emory and Brennan's work, but that seems as though our foreman was in there, that is, he worked for us; whether he ever worked for them I don't know.

Q. Where did you get this book?—A. I got it from Mr. Leroy, who will be here to-day; he is perfectly familiar with it.

Q. It is a book in your possession?—A. Yes, sir.

Q. And not in the possession of Emory and Brennan?—A. No, sir; our time-keeper took their time just as he did ours, and then we paid their men.

Q. For the week ending March 20, 1885, Thomas McDermott was head mason, and received $5 a day; at Champlain avenue for the week ending March 20 Gus Albright was the mason in charge, at $5 a day?—A. Then you come down here [pointing] and there is another one.

Q. Is that a mason?—A. Yes, sir.

Q. Elmer Imaly?—A. He was one of the contractors, you understand.

Q. One of the subcontractors, you mean; do you not?—A. Yes, sir.

Q. With Brennan and Emory?—A. Yes, sir; he is the man. No, that is another man. Imaly is not a contractor at all; he lives here in the city.

Q. Where does Albright live?—A. I don't know. L. A. Emory was the contractor; I was thinking of him.

Q. L. A. Emory also appears in that week at $5 a day, as mason in charge, and he was one of the subcontractors?—A. Yes, sir.

Q. That L. A. Emory was the first mason in charge at $5 a day, and there were two other masons—Richard Greene, mason, and John Slater?—A. Yes, sir.

(The clerk of the committee was directed to make out a tabular statement from these three books which the witness has just produced, showing the different shafts where employed, the names of the head masons, etc., together with their rate of compensation at certain dates, said tabulated statement to be printed in this connection, the witness assenting to the books remaining in possession of the committee for the length of time necessary to prepare the statement.)

BOOK NO. 1.—*P. F. Brennan, masonry, March* 1, 1885, *to February* 4, 1886.

WEST CONNECTING SHAFT.

Week ending—	Name and occupation.	Rate per day.
1885.		
Mar. 6	Thomas McNarama, mason	$5.00
	Thomas McDermott, mason	5.00
13	....do	5.00
	Elmer Imaly, mason	5.00
20	Thomas McDermott, mason	5.00
	Elmer Imaly, mason	5.00
27	....do	5.00
	Samuel Harper, mason	5.00
31	Elmer Imaly, mason	5.00
Apr. 3	Samuel Harper, mason	5.00
10	Thomas McDermott, mason	5.00
	....do	5.00

HOWARD UNIVERSITY SHAFT.

1885.		
Mar. 6	Lorenzo Lucas, mason	$5.00
	Elmer Imaly, mason	5.00
	L. A. Emery, mason	5.00
	Richard Greene, mason	5.00
13	L. A. Emery, mason	5.00
	Richard Greene, mason	5.00
	Thomas Slater, mason	5.00
20	L. A. Emery, mason	5.00
	Richard Greene, mason	5.00
	John Slater, mason	5.00
27	Richard Greene, mason	5.00
	John Slater, mason	5.00
31	Elmer Imaly, mason	5.00
	Samuel Harper, mason	5.00
	Richard Greene, mason	5.00
	John Slater, mason	5.00
Apr. 3	Elmer Imaly, mason	5.00
	Samuel Harper, mason	5.00
	Richard Greene, mason	5.00
	John Slater, mason	5.00
10	Elmer Imaly, mason	5.00
	Samuel Harper, mason	5.00
	Richard Greene, mason	5.00
	John Slater, mason	5.00
17	Samuel Harper, mason	5.00
	Emil Oats, mason	5.00
	James Garra, mason	5.00
	Elmer Imaly, mason	5.00
24	James Garra, mason	5.00
	Emil Oats, mason	5.00
	Samuel Harper, mason	5.00
	Elmer Imaly, mason	5.00
30	James Garra, mason	5.00
	Emil Oats, mason	5.00
	Elmer Imaly, mason	5.00
	Samuel Harper, mason	5.00
May 1	James Garra, mason	5.00

BOOK NO. 1.—*P. F. Brennan, masonry, March* 1, 1885, *to February* 4, 1886—Continued.

HOWARD UNIVERSITY SHAFT—Continued.

Week ending—	Name and occupation.	Rate per day.
1885.		
May 1	Emil Oats, mason	$5.00
	Elmer Imaly, mason	5.00
	Samuel Harper, mason	5.00
8	Elmer Imaly, mason	5.00
	Samuel Harper, mason	5.00
	James Garra, mason	5.00
	Emil Oats, mason	5.00
15	Elmer Imaly, mason	5.00
	Samuel Harper, mason	5.00
	James Garra, mason	5.00
	Emil Oats, mason	5.00
22	Elmer Imaly, mason	5.00
	Samuel Harper, mason	5.00
	James Garra, mason	5.00
	Emil Oats, mason	5.00
29	Elmer Imaly, foreman	5.00
	James Garra, mason	5.00
	Samuel Harper, mason	5.00
	Emil Oats, mason	5.00
31	Samuel Harper, mason	5.00
	Emil Oats, mason	5.00
	James Garra, mason	5.00
June 5	Frank Thompson, mason	5.00
	Samuel Harper, mason	5.00
	Emil Oats, mason	5.00
12	James Garra, mason	5.00
	Emil Oats, mason	5.00
19	James Garra, mason	5.00
	Emil Oats, mason	5.00
	George W. Dyer, mason	5.50
26	George Dyer, mason	5.00
	James Garra, mason	5.00
	Emil Oats, mason	5.00
30	G. W. Dyer, foreman	5.50
	James Garrah, mason	5.00
	Emil Oats, mason	5.00
July 3	G. W. Dyer, foreman	5.50
	James Garra, mason	5.00
	Emil Oates, mason	5.00
10	G. W. Dyer, mason	5.50
	Emil Oates, mason	5.00
	James Garra, mason	5.00
17	George Dyer, foreman	5.50
	James Garra, mason	5.00
	Emil Oates, mason	5.00
24	George Dyer, mason	5.50
	James Garra, mason	5.00
	Emil Oats, mason	5.00
31	George Dyer, foreman	5.50
	James Garry, mason	5.00
	Emil Oats, mason	5.00
Aug. 7	G. W. Dyer, foreman	5.50
	Emil Oats, mason	5.00
	James Garra, mason	5.00
14	George W. Dyer, foreman	5.50
	James Garra, mason	5.00
	Emil Oats, mason	5.00
21	G. W. Dyer, foreman	5.50
	James Garra, mason	5.00
	Emil Oates, mason	5.00
	Mike Dorsey, mason	5.00
	L. K. Emora, mason	5.00
28	L. A. Emery, foreman	5.00
	G. W. Dyer, mason	5.50
	Mike Dorsey, mason	5.00
Sept. 12	L. A. Emery, engineer	5.00
	Richard Greene, mason	5.25
18	L. A. Emery, foreman	5.00
	Richard Greene, mason	5.25
25	L. A. Emery, foreman	5.00
	Richard Greene, mason	5.25
Oct. 30	L. A. Emery, mason	5.00
	George Dyer, mason	5.50
31	L. A. Emery, mason	5.00
	George W. Dyer, mason	5.50
Nov. 6	L. A. Emery, mason	5.00
	George W. Dyer, mason	5.50

BOOK NO. 1.—*P. F. Brennan, masonry, March* 1, 1885, *to February* 4, 1886—Continued.

HOWARD UNIVERSITY SHAFT—Continued.

Week ending—	Name and occupation.	Rate per day.
1885.		
Nov. 13	L. A. Emery, foreman	$5.00
	George Dyer, mason	5.50
20	L. A. Emery, foreman	5.00
	George Dyer, mason	5.50
27	L. A. Emery, foreman	5.00
	G. W. Dyer, mason	5.50
Dec. 11	L. A. Emery, foreman	5.00
	George W. Dyer, mason	5.50
18	L. A. Emery, foreman	5.00
	George W. Dyer, mason	5.50
25	L. A. Emery, foreman	5.00
	George W. Dyer, mason	5.50
	Andy Dorsey, mason	5.00
30	George W. Dyer, mason	5.50
	Andy Dorsey, mason	5.00
1886.		
Jan. 1	George W. Dyer, mason	5.50
	Andy Dorsey, mason	5.00
8	George W. Dyer, foreman	5.50
	Andy Dorsey, mason	5.00
15	George W. Dyer, foreman	5.50
	Andy Dorsey, mason	5.00
22	George W. Dyer, mason	5.50
	Andy Dorsey, mason	5.00
	Mike Dorsey, mason	5.00
29	George W. Dyer, mason	5.50
	Andy Dorsey, mason	5.00
	Michael Dorsey, mason	5.00
Feb. 5	L. A. Emery, foreman	5.00
	George W. Dyer, mason	5.50
Oct. 15	L. A. Emery, foreman mason	5.00
22	L. A. Emery, foreman	5.00
29	....do	5.00
Nov. 5	....do	5.00
5	....do	5.00
12	Peter Gaughin, foreman	5.75
19	L. A. Emery, foreman	5.00
19	Peter Gaughin, foreman	5.25
26	Patrick Gaughkin, foreman	5.25
Dec. 3	....do	5.25
3	....do	5.25
10	Peter Gaughin, foreman	5.25
17	....do	5.25
	McMaugh, foreman (night shift)	5.00
24	Peter Gaughin, foreman	5.25
	Barney McMaugh, foreman (night shift)	5.00
31	Peter Gaughin, foreman	5.25
	Barney McMaugh, foreman (night shift)	5.25
1887.		
Jan. 7	Peter Gaughin, foreman	5.25
	Barney McMaugh, foreman (night shift)	5.00
14	Peter Gaughin, foreman (day)	5.25
	Mike McBrennan, mason	5.00
	....do	*5.00
	Barney McMaugh, foreman (night shift)	5.00
21	Peter Gaughin, foreman	5.25
	Mike McBrennan, mason	5.00
28	Peter Gaughin, foreman	5.25
	M. McBrennan, mason	5.00
Feb. 4	Peter Gaughin, foreman	5.25
	Mike Brennan, mason	5.00
4	Peter Gaughin, foreman	5.25
	Mike Brennan, mason	5.00

*Mistake, rated last week at $1.50 instead of $5.

CHAMPLAIN AVENUE SHAFT.

1885.		
Mar. 20	Gus Albright, mason	$5.00
	Thomas McDermott, mason	5.00
	Elmer Imaly, mason	5.00
27	Thomas McDermott, mason	5.00
	Elmer Imaly, mason	5.00

BOOK No. 1.—*P. F. Brennan, March* 1, 1885, *to February* 4, 1886—Continued.

CHAMPLAIN AVENUE SHAFT—Continued.

Week ending—	Name and occupation.	Rate per day.
1885.		
Mar. 20	L. A. Emery, mason	$5.00
31	Thomas McDermott, mason	5.00
	L. A. Emery, mason	5.00
Apr. 3	Thomas McDermott, mason	5.00
	L. A. Emery, mason	5.00
10	L. A. Emery, mason	5.00
	John Slater, mason	5.00
17	Elmer Imaly, mason	5.00
	L. K. Emery, mason	5.00
	John Slater, mason	5.00
24	Mike Dorsey, mason	5.00
	Elmer Imaly, mason	5.00
	L. A. Emery, mason	5.00
	John Slater, mason	5.00
30	Mike Dorsey, mason	5.00
	Andy Dorsey, mason	5.00
	L. A. Emery, mason	5.00
	John Slater, mason	5.00
May 1	Mick Dorsey, mason	5.00
	Andy Dorsey, mason	5.00
	L. K. Emery, mason	5.00
	John Slater, mason	5.00
8	L. A. Emery, mason	5.00
	John Slater, mason	5.00
	Mike Dorsey, mason	5.00
	Andy Dorsey, mason	5.00
	F. K. Thompson, mason	5.00
15	L. A. Emery, foreman	5.00
	John Slater, mason	5.00
	Mike Dorsey, mason	5.00
	Frank Thompson, mason	5.00
	Emil Onts, mason	5.00
	James Garra, mason	5.00
22	L. A. Emery, foreman	5.00
	John Slater, mason	5.00
	Frank Thompson, mason	5.00
	Michael Dorsey, mason	5.00
29	L. A. Emery, foreman	5.00
	John Slater, mason	5.00
	Frank Thompson, mason	5.00
	Mike Dorsey, mason	5.00
31	Mike Dorsey, mason	5.00
June 5	L. A. Emery, mason	5.00
	John Slater, mason	5.00
	Mike Dorsey, mason	5.00
	Frank Thompson, mason	5.00
12	L. A. Emery, mason	5.00
	John Slater, mason	5.00
	Mike Dorsey, mason	5.00
19	L. A. Emery, mason	5.00
	John Slater, mason	5.00
	Mike Dorsey, mason	5.00
26	L. A. Emery, mason	5.00
	John Slater, mason	5.00
	Mike Dorsey, mason	5.00
30	L. A. Emery, mason	5.00
	John Slater, mason	5.00
	Mike Dorsey, mason	5.00
July 3	L. A. Emery, mason	5.00
	John Slater, mason	5.00
	Mike Dorsey, mason	5.00
10	L. A. Emery, mason	5.00
	John Slater, mason	5.00
	Mike Dorsey, mason	5.00
17	L. A. Emery, foreman	5.00
	John Slater, mason	5.00
	Mike Dorsey, mason	5.00
24	L. A. Emery, foreman	5.00
	John Slater, mason	5.00
	Mike Dorsey, mason	5.00
31	L. A. Emery, mason	5.00
	John Slater, mason	5.00
	Mike Dorsey, mason	5.00
Aug. 7	L. A. Emery, foreman	5.00
	Mike Dorsey, mason	5.00
14	L. A. Emery, foreman	5.00
	Mike Dorsey, mason	5.00

BOOK NO. 1.—*P. F. Brennan, masonry, March* 1, 1885, *to February* 4, 1886—Continued.

CHAMPLAIN AVENUE SHAFT—Continued.

Week ending—	Name and occupation.	Rate per day.
1885.		
Aug. 21	L. A. Emery, foreman	$5.00
	Mike Dorsey, mason	5.00
Sept. 25	L. A. Emery, foreman	5.00
	Richard Greene, mason	5.25
30	L. A. Emery, foreman	5.00
	Richard Greene, mason	5.25
Oct. 2	L. A. Emory	5.00
	Richard Greene	5.25
9	L. A. Emery, foreman	5.00
	Richard Greene, mason	5.25
16	L. A. Emery, foreman	5.00
23	....do	5.00
	George Dyer, mason	5.00
1886.		
Nov. 12	L. A. Emery, foreman	5.00
19	....do	5.00
26	....do	5.00
Dec. 3	....do	5.00
	....do	5.00
10	....do	5.00
17	....do	5.00
24	....do	5.00
31	....do	5.00
1887.		
Jan. 7	....do	5.00
14	....do	5.00
21	....do	5.00
28	....do	5.00
Feb. 4	....do	5.00
	....do	5.00

ROCK CREEK SHAFT (EAST).

1887.	Night shift:	
Jan. 14	Barney McMaugh, foreman	5.00
21	....do	5.00
28	....do	5.00
Feb. 4	....do	5.00
	....do	5.00
	....do	5.00

BOOK NO. 2.—*P. F. Brennan, February* 5, 1887, *to October* 15, 1887.

ROCK CREEK SHAFT (EAST).

Week ending—	Name and occupation.	Rate per day.
1887.		
Feb. 11	Barney McMaugh, foreman (day)	$5.00
18	M. Kerns, foreman (day)	5.00
	Barn. McMaugh, foreman (night)	5.00
25	Barney McMaugh, foreman (day)	5.00
	M. G. Kerns, foreman (night)	5.25
Mar. 4	M. Kerns, foreman (day)	5.25
	Barney McMaugh, foreman (night)	5.00
	M. Kerns, foreman (day)	5.25
	Barney McMaugh foreman (night)	5.00
11	Barney McMaugh, foreman (day)	5.00
	M. Kerns, foreman (night)	5.25
18	Morris Kerns, foreman (day)	5.25
	John Ferryll, foreman (night)	5.00
25	Morris Kerns, foreman (night)	5.25
Apr. 1	Morris Kerns, foreman (day)	5.25
	John Ferryll, foreman (night)	5.00
8	Morris Kerns, foreman (night)	5.25
15	Morris Kerns, foreman (day)	5.25

BOOK NO. 2.—*P. F. Brennan, February* 5, 1887, *to October* 15, 1887—Continued.

ROCK CREEK SHAFT (EAST)—Continued.

Week ending—	Name and occupation.	Rate per day.
1887.		
Apr. 15	Thomas Terryll, mason (night)	$5.00
22	Thomas Terryll, mason (night)	5.00
29	Morris Kerns, foreman (day)	5.25
	John Ferrell, foreman (night)	5.00
	Thomas Terrell, foreman (night)	5.00
May 6	Morris Kerns, foreman (day)	5.25
	Morris Kerns, foreman (day)	5.25
	John Millar, mason (day)	5.00
13	Andr. Dorsey, foreman (day)	5.25
	Josef Byron, mason (day)	5.00
	Charles Sweeney, mason (day)	5.00
	Morris Kerns, foreman (night)	5.25
	Morgan Dorsey, mason (night)	5.00
	John Millar, mason (night)	5.00
	Mike Garra, mason (night)	5.00
20	Morgan Dorsey, mason (day)	5.00
	Mike Garra, mason (day)	5.00
	John Millar, mason (day)	5.00
	Andr. Dorsey, mason (night)	5.25
	Charles Sweeney, mason (night)	5.00
	Josef Byron, mason (night)	5.00
27	Andr. Dorsey, foreman (day)	5.25
	Josef Byron, mason (day)	5.00
	Charles Sweeney, mason (day)	5.00
	Morgan Dorsey, mason (night)	5.00
	Mike Garra, mason (night)	5.00
	Charles Sweeney, mason (night)	5.00
June 3	Morgan Dorsey, mason (day)	5.00
	Andrew Dorsey, mason (day)	5.25
	Charles Sweeney, mason (day)	5.00
	Josef Byron, mason (day)	5.00
	Andrew Dorsey, mason (night)	5.25
	Josef Byron, mason (night)	5.00
	Harry Leacock, mason (night)	5.00
	Morgan Dorsey, mason (day)	5.00
	Charles Sweeney, mason (day)	5.00
	Andrew Dorsey, foreman (night)	5.25
	Josef Byron, mason (night)	5.00
	Harry Leacock, mason (night)	5.00
10	Andrew Dorsey, foreman (day)	5.25
	Josef Byron, mason (day)	5.00
	Harry Leacock, mason (day)	5.00
	Morgan Dorsey, mason (night)	5.00
	Charles Sweeney, mason (night)	5.00

ROCK CREEK (WEST).

1887.		
June 17	Morgan Dorsey, mason (day)	5.00
	Josef Byron, mason (day)	5.00
	John Cuniff, mason (day)	5.00
	Andrew Dorsey, foreman (night)	5.25
	Harry Leacock, mason (night)	5.00
	Josef Byron, mason (night)	5.00
June 24	Andrew Dorsey, foreman (day)	5.25
	Harry Leacock, mason (day)	5.00
	Morgan Dorsey, mason (night)	5.00
	Josef Byron, mason (night)	5.00
	John Cuniff, mason (night)	5.00
July 1	John Cuniff, foreman (day)	5.50
	Morgan Dorsey, mason (day)	5.00
	Josef Byron, mason (day)	5.00
	Andrew Dorsey, foreman (night)	5.50
	Harry Leacock, mason (night)	5.00
	Charles Masson, mason (night)	5.00
	John Cuniff, foreman (day)	5.50
	Morgan Dorsey, mason (day)	5.00
	Andy Dorsey, mason (night)	5.50
	Charles Masson, mason (night)	5.00
	Andrew Dorsey, foreman (day)	5.50
	Charles Masson, mason (day)	5.00
	Harry Leacock, mason (day)	5.00
	John Cuniff, foreman (night)	5.50

BOOK NO. 2.—*P. F. Brennan, February* 5, 1887, *to October* 15, 1887—Continued.

ROCK CREEK (WEST)—Continued.

Week ending—	Name and occupation.	Rate per day.
1887.		
July 1	Morgan Dorsey, mason (night)	$5.00
15	John Cuniff, foreman (day)	5.50
	Morgan Dorsey, mason (day)	5.00
	Andrew Dorsey, foreman (night)	5.50
	Charles Masson, mason (night)	5.00
	Harry Leacock, mason (night)	5.00
22	Andrew Dorsey, foreman (day)	5.50
	Charles Masson, mason (day)	5.00
	Harry Leacock, mason (day)	5.00
	John Cuniff, foreman (night)	5.50
	Morgan Dorsey, mason (night)	5.00
	George Kendall, mason (night)	5.00
	Archy Dorsey, mason (night)	5.00
	James O'Donald, mason (night)	5.00
29	John Cuniff, foreman (day)	5.50
	George Kendall, mason (day)	5.00
	James O'Donald, mason (day)	5.00
	Andrew Dorsey, foreman (night)	5.50
	Charles Masson, mason (night)	5.00
	Harry Leacock, mason (night	5.00
Aug. 5	Andrew Dorsey, foreman (day)	5.50
	Harry Leacock, mason (day)	5.00
	Charles Masson, mason (day)	5.00
	John Cuniff, foreman (night)	5.50
	George Kendall, mason (night)	5.00
	Albert Wilson, mason (day)	5.00
12	John Cuniff, foreman (day)	5.50
	George Kendall, mason (day)	5.50
	Oscar H. Briggs, mason (day)	5.00
	Andrew Dorsey, foreman (night)	5.50
	Harry Leacock, mason (night)	5.00
	Albert Wilson, mason (night)	5.00
	Charles Masson, mason (night)	5.00
19	Andrew Dorsey, foreman (day)	5.50
	Harry Leacock, mason (day)	5.00
	Charles Masson, mason (day)	5.00
	Albert Wilson, mason (day)	5.00
	John Cuniff, foreman (night)	5.50
	George Kendall, mason (night)	5.00
	Oscar H. Briggs, mason (night)	5.00
	John Emery, mason (night)	5.00
26	John Cuniff, foreman (day)	5.50
	Oscar H. Briggs, mason (day)	5.00
	John Emery, mason (day)	5.00
	George Kendall, mason (day)	5.00
	Andrew Dorsey, foreman (night)	5.50
	Harry Leacock, mason (night)	5.00
	Charles Masson, mason (night)	5.00
	Albert Wilson, mason (night)	5.00
Sept. 2	Andrew Dorsey, foreman (day)	5.50
	Harry Leacock, mason (day)	5.00
	Charles Masson, mason (day)	5.00
	P. F. Brennan (day)	5.00
	John Cuniff, foreman (night)	5.50
	Oscar H. Briggs, mason (night)	5.00
	W. E. Durrer, mason (night)	5.00
9	John Cuniff, foreman (day)	5.50
	Oscar H. Briggs, mason (day)	5.00
	James Daniel, mason (day)	5.00
	George Fogler, mason (day)	5.00
	P. F. Brennan (day)	5.00
	Andrew Dorsey, foreman (night)	5.50
	Harry Leacock, mason (night)	5.00
	Charles Masson, mason (night)	5.00
16	Andrew Dorsey, foreman (day)	5.50
	Harry Leacock, mason (day)	5.00
	Charles Masson, mason (day	5.00
	John Cuniff, foreman (night)	5.50
	Oscar Briggs, mason (night)	5.00
	Dan Mannings, mason (night)	5.00
23	John Cuniff, foreman (day)	5.50
	Oscar H. Briggs, mason (day)	5.00
	Dan Mannings, mason (day)	5.00
	Andrew Dorsey, foreman (night)	5.50
	Harry Leacock, mason (night)	5.00
	Charles Masson, mason (night)	5.00

BOOK NO. 2.—*P. F. Brennan, February* 5, 1887, *to October* 15, 1887—Continued.

CHAMPLAIN AVENUE SHAFT (WEST).

Week ending—	Name and occupation.	Rate per day.
1887.		
Feb. 11	L. A. Emery, foreman	$5.00
	John Terryll, foreman	5.00
18	Thomas Terryll, foreman	5.00
25	....do	5.00
Mar 4	....do	5.00
11	.... do	5.00
18	L. A. Emery, superintendent	5.00
	Thomas Terryll, foreman	5.00
25	L. A. Emery, superintendent	5.00
	Thomas Terryll, foreman	5.00
Apr. 1	....do	5.00
8	....do	5.00
15	....do	5.00
22	L. A. Emery, superintendent	5.00
	Thomas Terryll, foreman	5.00
	M. Kerns, mason	5.25
20	L. A. Emery, superintendent	5.00
	Thomas Terryll, foreman	5.00
May 6	Thomas Terryll, foreman	5.00
	L. A. Emery, superintendent	5.00
	Mike McCarthy, mason	5.00
13	L. A. Emery, superintendent	5.00
	Thomas Terryll	5.00
	George Kendall, mason	5.00
	William Kendall, mason	5.00
20	L. A. Emery, superintendent	5.00
	John Millar, foreman	5.00
	George Kendall, mason	5.00
	William Kendall, mason	5.00
27	L. A. Emery, superintendent	5.00
	John Miller, foreman	5.00
	George Kendall, mason	5.00
	William Kendall, mason	5.00
June 3	L. A. Emery, superintendent	5.00
	John Millar, foreman	5.00
	George Kendall, mason	5.00
	William Kendall, mason	5.00
10	L. A. Emery, superintendent	5.00
	John Millar, foreman	5.00
	George Kendall, mason	5.00
	William Kendall, mason	5.00
	John Smith	5.00
17	John Millar, foreman	.....
	George Kendall, mason	5.00
	William Kendall, mason	5.00
	Josef Byron, mason	5.00
	Samuel Kendall, mason	5.00
24	George Kendall, mason	5.00
	William Kendall, mason	5.00
	Samuel Kendall, mason	5.00
	L. A. Emery, superintendent	5.00
July 1	....do	5.00
	George Kendall, mason	5.00
	William Kendall, mason	5.00
8	L. A. Emery, superintendent	5.00
	George Kendall, mason	5.00
	William Kendall, mason	5.00
	Samuel Kendall, mason	5.00
15	L. A. Emery, superintendent	5.00
	George Kendall, mason	5.00
	William Kendall, mason	5.00
	Samuel Kendall, mason	5.00
22	L. A. Emery, superintendent	5.00
	George Kendall, mason	5.00
	William Kendall, mason	5.00

CHAMPLAIN AVENUE (EAST).

1887.		
Aug. 26	Samuel Kendall, foreman	5.50
	George Kendall, mason	5.00
Sept. 2	Samuel Kendall, foreman	5.00
	George Kendall, mason	5.50
	Fred Kendall, mason	5.00

BOOK No. 2.—*P. F. Brennan, February* 5, 1887, *to October* 15, 1887—Continued.

CHAMPLAIN AVENUE (EAST)—Continued.

Week ending—	Name and occupation.	Rate per day.
1887.		
Sept. 9	George Kendall, foreman	$5.50
	Samuel Kendall, mason	5.00
	Fred Kendall, mason	5.00
16	George Kendall, foreman	5.50
	Samuel Kendall, mason	5.00
	Fred Kendall, mason	5.00
23	George Kendall, foreman	5.50

HOWARD UNIVERSITY SHAFT.

1887.		
Feb. 11	Peter Gaughen, foreman	5.25
	Mike Brennan, mason	5.00
18	L. A. Emery, foreman	5.00
	Peter Gaughen, foreman	5.25
	Mike Brennan, mason	5.00
	John Ferryll, mason	5.00
25	John Ferryll, foreman	5.00
	L. A. Emery, superintendent	5.00
Mar. 4	John Ferryll, foreman	5.00
11	John Ferryll, foreman	5.00
	L. A. Emery, superintendent	5.00
	L. A. Emery, superintendent (last week omitted)	5.00
	D. J. Imlar	5.00
25	John Ferryll, foreman	5.00
Apr. 1	John Ferryll, foreman	5.00
	L. A. Emery, superintendent	5.00
	Morris Kerns, mason	5.00
8	L. A. Emery, superintendent	5.00
	Morris Kerns, mason	5.25
	Fred Kendall, mason	5.00
	John Ferryll, foreman	5.00
	Sam Kendall, mason	5.00
15	L. A. Emery, superintendent	5.00
	John Ferryll, foreman	5.00
	Fred Kendall, mason	5.00
	Sam Kendall, mason	5.00
22	John Ferryll, foreman	5.00
	Fred Kendall, mason	5.00
	Samuel Kendall, mason	5.00
29	John Ferryll, foreman	5.00
	Fred Kendall, mason	5.00
	Samuel Kendall, mason	5.00
May 6	John Ferryll, foreman	5.00
	Fred Kendall, mason	5.00
	Samuel Kendall, mason	5.00
13	John Ferryll, foreman	5.25
	Fred Kendall, mason	5.00
	Samuel Kendall	5.00
20	John Ferryll, foreman	5.25
	Samuel Kendall, mason	5.00
	Fred Kendall, mason	5.00
27	John Terryll, foreman	5.25
	Samuel Kendall, mason	5.00
	Fred Kendall, mason	5.00
June 3	John Ferryll, foreman	5.25
	Samuel Kendall, mason	5.00
	Fred Kendall, mason	5.00
10	John Ferryll, foreman (day)	5.25
	Samuel Kendall, mason (day)	5.00
	Fred Kendall, mason (day)	5.00
	Charles Masson, mason (night)	5.00
	Harry Leacock, mason (night	5.00
17	John Ferryll, foreman (day)	5.25
	Fred Kendall, mason (day)	5.00
	Samuel Kendall, mason (day)	5.00
	Harry Leacock, mason (day)	5.00
	Joseph Tyerll, mason (day)	5.00
	John Miller, mason (day)	5.00
	Charles Masson, mason (night)	5.00
	Harry Leacock, mason (night)	5.00
	Mike Garra, mason (night)	5.00
	Dan Dalley, mason (night)	5.00
24	John Ferryll, foreman (day)	5.25

BOOK NO. 2.—*P. F. Brennan February* 5, 1887, *to October* 15, 1887—Continued.

HOWARD UNIVERSITY SHAFT—Continued.

Week ending—	Name and occupation.	Rate per day.
1887.		
June 24	Fred Kendall, mason (day)	$5.00
	John Millar, mason (day)	5.00
	Joseph Tyrrell, mason (day)	5.00
	Mike Gara, foreman (night)	5.00
	Dan Dailey, mason (night)	5.00
	Joseph Tyrrell, mason (night)	5.00
July 1	Mike Garra, foreman (day)	5.50
	Joseph Terryll, mason (day)	5.00
	Fred Kendall, mason (night)	5.00
	John Miller, mason (night)	5.00
	John Ferryll, foreman (night)	5.50
8	John Ferryll, foreman (day)	5.00
	Fred Kendall, mason (day)	5.00
	Alb. Turner, mason (day)	5.00
	Mike Garra, foreman (night)	5.50
	John Ferryll, mason (night)	5.00
15	Mike Garra, foreman (day)	5.50
	Joseph Terryll, mason (day)	5.00
	John Ferryll, foreman (night)	5.50
	Fred Kendall, mason (night)	5.00
	John Millar, mason (night)	5.00
22	John Millar, mason (day)	5.00
	Fred Kendall, mason (day)	5.00
	Mike Garra, foreman (night)	5.50
	Joseph Terryll, mason (night)	5.00
	Samuel Kendall, foreman (night)	5.50
	William Kendall, mason (night)	5.00
29	L. A. Emery, superintendent (day)	5.00
	Samuel Kendall, foreman (day)	5.50
	William Kendall, mason (day)	5.00
	Joseph Terryll, mason (day)	5.00
	John Millar, mason (night)	5.00
	Fred Kendall, mason (night)	5.00
	Joseph Terryll, mason (night)	5.00
	John Ferryll, foreman (night)	5.50
Aug. 5	L. A. Emery, superintendent (day)	5.00
	John Ferryll, foreman (day)	5.50
	Fred Kendall, mason (day)	5.00
	John Millar, mason (day)	5.00
	Samuel Kendall, foreman (night)	5.50
	William Kendall, mason (night)	5.00
	Joseph Terryll, mason (night)	5.00
	P. F. Brennan (day)	5.00
12	L. A. Emery, superintendent (day)	5.00
	Samuel Kendall, foreman (day)	5.50
	William Kendall, mason (day)	5.00
	Joseph Terryll, mason (day)	5.00
	John Ferryll, foreman (night)	5.50
	John Millar, mason (night)	5.00
	Fred Kendall, mason (night)	5.00
19.	L. A. Emery, superintendent (day)	5.00
	John Ferryll, foreman (day)	5.50
	Fred Kendall, mason (day)	5.00
	John Millar, mason (day)	5.00
	Pat McCue, mason (day)	5.00
	P. F. Brennan (day)	5.00
	Sam Kendall, foreman (night)	5.50
	William Kendall, mason (night)	5.00
	Joseph Tyrrell, mason (night)	5.00
	John Millar, foreman (night)	5.50
26	L. A. Emery, superintendent (day)	5.00
	John Millar, foreman (day)	5.50
	Joseph Terryll, mason (day)	5.00
	William Kendall, mason (day)	5.00
	John Ferryll, foreman (night)	5.50
	Fred Kendall, mason (night)	5.00
	Pat McCue, mason (night)	5.00
	John Emery, mason (night)	5.00
Sept. 2	L. A. Emery, superintendent (day)	5.00
	John Ferryll, foreman (day)	5.50
	Fred Kendall, mason (day)	5.00
	John Emery, mason (day)	5.00
	Thomas Smith, mason (day)	5.00
	John Millar, foreman (night)	5.50
	William Kendall, mason (night)	5.00
	Joseph Terryll, mason (night)	5.00
9	L. A. Emery, superintendent (day)	5.00

BOOK NO. 2.—*P. F. Brennan, February* 5, 1887, *to October* 15, 1887—Continued.

HOWARD UNIVERSITY SHAFT—Continued.

Week ending—	Name and occupation.	Rate per day.
1887.		
Sept. 9	John Millar, foreman (day)	$5.50
	Joseph Terryll, mason (day)	5.00
	William Kendall, mason (day)	5.00
	John Ferryll, foreman (night)	5.50
	John Emery, mason (night)	5.00
	Thomas Smith, mason (night)	5.00
16	L. A. Emery, superintendent (day)	5.00
	John Ferryll, foreman (day)	5.50
	John Emery, mason (day)	5.00
	Thomas Smith, mason (day)	5.00
	P. F. Brenan, mason (day)	5.00
	John Millar, foreman (night)	5.50
	Joseph Terryll, mason (night)	5.00
	William Kendall, mason (night)	5.06
23	John Miller, foreman (day)	5.50
	Joseph Terryll, mason (day)	5.00
	Sam Kendall, mason (day)	5.00
	L. A. Emery superintendent (day)	5.00
	John Cuniff, mason (day)	5.50
	John Ferryll, foreman (night)	5.50
	John Emery, manson (night)	5.00
	Thomas Smith, mason	5.00
30	L. A. Emery, superintendent (day)	5.00
	John Ferryll, foreman (day)	5.50
	John Emery, mason (day)	5.00
	Thomas Smith, mason (day)	5.00
	Charles Masson, mason (day)	5.00
	John Millar, foreman (night)	5.50
	Joseph Terryll, mason (night)	5.00
	John Cuniff, mason (night)	5.50
	E. E. Justin, mason (night)	5.00

WEST CONNECTING SHAFT.

1887.		
Feb. 18	James F. Palmer, foreman	5.00
25	John Palmer, foreman	5.00
	George Bosswell, mason	5.00
4	John F. Palmer, foreman	5.00
	George Bosswell, mason	5.00
Mar. 11	John F. Palmer, foreman	5.00
	George Bosswell, mason	5.00
18	P. Gaughen, foreman	5.00
	George Bosswell, mason	5.00
25	John F. Palmer, foreman	5.00
	P. Gaughen, foreman	5.00
	George Bosswell, mason	5.00
Apr. 1	Peter Gaughen, foreman	5.00
	George Bosswell, mason	5.00
8	Peter Gaughen, foreman	5.00
	George Bosswell, mason	5.00
15	George Bosswell, mason	5.00
	Peter Gaughen, mason	5.00
22	George Bosswell, mason	5.00
	P. Gaughen, mason	5.00
29	Peter Gaughen, mason	5.00
May 6	Peter Gaughen, foreman	5.00
13	Peter Gaughen, foreman	5.25
20	Peter Gaughen, foreman	5.25
27	Peter Gaughen, foreman	5.25
June 3	Peter Gaughen, foreman	5.25
10	E. E. Imlai, foreman	5.00
17	E. E. Imlai, foreman	5.00
24	E. E. Imlai, foreman	5.50
	Charles Sweeney, mason	5.00
	Duffy Lamar, mason	5.00
July 1	E. E. Imlai, foreman	5.50
	Charles Sweeney, mason	5.00
	Duffy Lamar, mason	5.00

BOOK NO. 2.—*P. F. Brennan, February* 5, 1887, *to October* 15, 1887—Continued.

FOUNDRY BRANCH SHAFT (WEST).

Week ending—	Name and occupation.	Rate per day.
1887.		
July 1	E. E. Imlai, foreman	$5.50
	Charles Sweeney, mason	5.00
	Duffy Lamar, mason	5.00
8	E. E. Imlai, foreman	5.50
	Charles Sweeney, mason	5.00
	Duffy Lamar, mason	5.00
15	E. E. Imlai, foreman	5.50
	Charles Sweeney, mason	5.00
22	E. E. Imlai, foreman	5.50
	Charles Sweeney, mason	5.00
	Sam Kendall, mason	5.00
29	E. E. Imlai, foreman	5.50
	Charles Sweeney, mason	5.00
Aug. 5	E. E. Imlai, foreman	5.50
	Charles Sweeney, mason	5.00
12	E. E. Imlai, foreman	5.50
	Charles Sweeney, mason	5.00
19	E. E. Imlai, foreman	5.50
	Charles Sweeney, mason	5.00
26	E. E. Imlai, foreman	5.50
	Charles Sweeney, mason	5.00
Sept. 2	E. E. Imlai, foreman	5.50
	Charles Sweeney, mason	5.00
9	E. E. Imlai, foreman	5.50
	Charles Sweeney, mason	5.00
	George W. Dudro, mason	5.00
16	E. E. Imlai, foreman	5.50
	Charles Sweeney, mason	5.00
23	E. E. Imlai, foreman	5.50

BOOK NO. 3.—*P. F. Brennan. Time-book. October* 16 1887, *to* ———.

ROCK CREEK SHAFT (EAST).

Week ending—	Name and occupation.	Rate per day.
1888.		
May 18	James Lanagan, foreman	$5.00
25	John T. Palmer, superintendent	5.00
	Thomas Lanagan, stone-mason	5.00
	Thomas Tyrrell, brick-mason	5.00
June 1	John F. Palmer, superintendent	5.00
	Thomas Lanagan, foreman	5.00
	Thomas Terryll, brick-mason	5.00
8	John F. Palmer, superintendent	5.00
	Thomas Terryll, brick-mason	5.00
	Theodore Harbeak, brick-mason	5.00

ROCK CREEK SHAFT (WEST).

1888.		
June 15	Thomas Terryll, brick-mason	5.50
	Theodore Harbeak; brick-mason	5.00
	Ed. Brennan, brick-mason	5.00
	John F. Palmer, superintendent	5.00
22	Thomas Lannagan, stone-mason	5.00

ROCK CREEK SHAFT (EAST AND WEST).

1888.		
June 22	Samuel Kendall, brick-mason	5.00
	Frank Thompson, brick-mason	5.00
	John Wood, brick-mason	5.00

BOOK No. 3.—*P. F. Brennan. Time-book. October 16, 1887, to* ——— —Continued.

ROCK CREEK SHAFT (WEST).

Week ending—	Name and occupation.	Rate per day.
1888.		
June 29	Thomas Lannagan,, stone-mason	$5.00

ROCK CREEK SHAFT (EAST AND WEST).

1888.		
June 29	Frank Thompson, brick-mason	5.00
	Theodore Harbeak	5.00
	John Wood, brick-mason	5.00

ROCK CREEK SHAFT (WEST).

1888.		
July 6	Frank Thompson, brick-mason	5.00
	Theo. Harbeak, brick-mason	5.00
	John Wood, brick-mason	5.00
13	Thomas Lanagan, stone-mason	5.00
	Frank Thompson, brick-mason	5.00
	Theo. Harbeak, brick-mason	5.00
	John Wood, brick-mason	5.00
20	Frank Thompson, brick-mason	5.00
	Theo. Harbeak, brick-mason	5.00
	John Wood, brick-mason	5.00
27	Theo. Harbeak, brick-mason	5.00
	John Wood, brick-mason	5.00
Aug. 3	Theo. Harbeak, brick-mason	5.00
	John Wood, brick-mason	5.00

ROCK CREEK SHAFT (EAST AND WEST).

1888.		
Aug. 10	Theo. Harbeak, brick-mason	5.00
	John Wood, brick-mason	5.00
17	Theo. Harbeak, brick-mason	5.00
	William Kendall, brick-mason	5.00
	Fred. Kendall, brick-mason	5.00
	John F. Palmer	5.00
	George Kendall, brick-mason	5.00
	Samuel Kendall, brick-mason	5.00
24	John F. Palmer	5.00
	Theodore Harbeak, brick-mason	5.00
	William Kendall, brick-mason	5.00
	Fred. Kendall, brick-mason	5.00
	James Lannagan, stone-mason	5.00
31	John F. Palmer	5.00
	Theodore Harbeak, brick-mason	5.00
	William Kendall, brick-mason	5.00
	Fred. Kendall, brick-mason	5.00
Sept. 7	John F. Palmer	5.00
	Fred. Kendall, brick-mason	5.00
14	John F. Palmer	5.00
	Fred. Kendall, brick-mason	5.00
	Theodore Harbeak, brick-mason	5.00
	William Kendall, brick-mason	5.00
21	John F. Palmer	5.00
	Jesse Kimball, brick-mason	5.00
28	John F. Palmer	5.00
	Theodore Harbeak, brick-mason	5.00
	Jesse Kimball, brick-mason	5.00
Oct. 5	John F. Palmer	5.00
	Theodore Harbeak, brick-mason	5.00
12	John F. Palmer	5.00
	Theodore Harbeak, brick-mason	5.00
	James M. Johnson, brick-mason	5.00
	Mike Sullivan, brick-mason	5.00
19	John F. Palmer	5.00
	Theo. Harbeak, brick-mason	5.00
	Mike Sullivan, brick-mason	5.00

BOOK NO. 3.—*P. F. Brennan. Time-book. October 16, to* ——— —Continued.

ROCK CREEK SHAFT (EAST AND WEST)—Continued.

Week ending—	Name and occupation.	Rate per day.
1888.		
Oct. 26	John F. Palmer	$5.00
	Theo. Harbeak, brick-mason	5.00
	Mike Sullivan, brick-mason	5.00
	Jesse Kimball, brick-mason	5.00

ROCK CREEK SHAFT (WEST).

1888.		
Oct. 26	James Lannagan, stone-mason	5.00
Nov. 2	John F. Palmer	5.00
	Theo. Harbeak, brick-mason	5.00
	Jesse Kimball, brick-mason	5.00
	James Lannagan, stone-mason (night)	5.00
9	John Palmer	5.00
	Theo. Harbeak, brick-mason	5.00

CHAMPLAIN AVENUE SHAFT (EAST).

1888.		
May 25	James Lannagan, foreman	5.00
June 1	P. F. Brennan	5.00
	James Lannagan, foreman	5.00
8	P. F. Brennan	5.00
	James Lannagan, stone-mason	5.00
15	James Lannagan, stone-mason	5.00
	George Kendall, brick-mason	5.00
	Fred Kendall, brick-mason	5.00
	William Kendall, brick-mason	5.00
	Sam Kendall, brick-mason	5.00
22	P. F. Brennan, brick-mason	5.00
	James Lannagan, stone-mason	5.00
	George Kendall, brick-mason	5.00
	William Kendall, brick-mason	5.00
	Fred Kendall, brick-mason	5.00
	John F. Palmer, superintendent	5.00
29	James Lannagan, stone-mason	5.00
	Day:	
	George Kendall, brick-mason	5.00
	William Kendall, brick-mason	5.00
	Sam Kendall, brick-mason	5.00
	Fred Kendall, brick-mason	5.00
	Night:	
	Fred Kendall, brick-mason	5.00
July 6	James Lannagan, stone-mason	5.00
	Day:	
	James F. Palmer	5.00
	George Kendall, brick-mason	5.00
	William Kendall, brick-mason	5.00
	Frederick Kendall, brick-mason	5.00
	Samuel Kendall, brick-mason	5.00
	Day:	
13	James Lannagan, stone-mason	5.00
	James F. Palmer	5.00
	George Kendall, brick-mason	5.00
	Fred Kendall, brick-mason	5.00
	Samuel Kendall, brick-mason	5.00
	William Kendall, brick-mason	5.00
20	James Lannagan, stone-mason	5.00
27	James Lannagan, stone-mason	5.00
	John F. Palmer, superintendent	5.00
	Fred Kendall, brick-mason	5.00
	William Kendall, brick-mason	5.00
	Pat Carlon, brick-mason	5.00
	John Wood	5.00
Aug. 3	James Lannagan, stone-mason	5.00
	John F. Palmer	5.00
	Fred Kendall, brick-mason	5.00
	William Kendall, brick-mason	5.00
	John Wood	5.00
10	John F. Palmer	5.00

BOOK No. 3.—*P. F. Brennan. Time-book. October* 16, 1887, *to* ——— —Continued.

CHAMPLAIN AVENUE SHAFT (EAST)—Continued.

Week ending—	Name and occupation.	Rate per day.
1888.		
Aug. 10	Fred Kendall, brick-mason	$5.00
	William Kendall, brick-mason	5.00
17	James Lannagan, stone-mason	5.00
24	George Kendall, brick-mason	5.00
	Samuel Kendall, brick-mason	5.00
31	George Kendall, brick-mason	5.00
	Samuel Kendall, brick-mason	5.00
Oct. 5	James Lannagan, stone-mason	5.00
12	James Lannagan, stone-mason	5.00
19	James Lannagan, stone-mason	5.00

FOUNDRY BRANCH SHAFT (EAST).

1888.		
June 8	Thomas Lannagan, foreman	5.00
15	Thomas Lannagan, stone-mason	5.00
22	Thomas Tyrrell, brick-mason	5.50
	Theo. Harbeak, brick-mason	5.00
	Ed. Brennan, brick-mason	5.00
	P. F. Brennan	5.00
	Jesse Kimball, brick-mason	5.00
29	Thomas Terryll, brick-mason	5.50
	Ed. Brennan, brick-mason	5.00
	Jesse Kimball, brick-mason	5.00
July 6	Pat Brennan	5.00
	Ed. Brennan, brick-mason	5.00
	Jesse Kimball, brick-mason	5.00
	Thomas Lannagan, stone-mason	5.00
13	P. F. Brennan	5.00
	Ed. Brennan, brick-mason	5.00
	Jesse Kimball, brick-mason	5.00

FOUNDRY BRANCH SHAFT (EAST AND WEST).

1888.		
July 20	Thomas Lannagan, stone-mason	5.00
	Pat Brennan	5.00
	Ed. Brennan, brick-mason	5.00
	Jesse Kimball, brick-mason	5.00
27	Thomas Lannagan, stone-mason	5.00
	P. F. Brennan	5.00
	Ed. Brennan, brick-mason	5.00
	Jesse Kimball, brick-mason	5.00
Aug. 3	Thomas Lannagan, stone-mason	5.00
	P. F. Brennan	5.00
	Ed. Brennan, brick-mason	5.00
	Jesse Kimball, brick-mason	5.00

FOUNDRY BRANCH SHAFT (EAST).

1888.		
Aug. 10	Thomas Lannagan, stone-mason	5.00
	P. F. Brennan	5.00
	Ed. Brennan, brick-mason	5.00
	Jesse Kimball, brick-mason	5.00
17	P. F. Brennan	5.00
	Ed. Brennan, brick-mason	5.00
	Jesse Kimball, brick-mason	5.00

FOUNDRY BRANCH SHAFT (EAST AND WEST).

1888.		
Aug. 24	Thomas Lannagan, stone-mason	5.00
	P. F. Brennan	5.00
	Ed. Brennan, brick-mason	5.00
	Jesse Kimball, brick-mason	5.00
31	Thomas Lannagan, stone-mason	5.00

BOOK No. 3.—*P. F. Brennan. Time-book. October* 16, 1887, *to* ——— —Continued.

FOUNDRY BRANCH SHAFT (EAST AND WEST)—Continued.

Week ending—	Name and occupation.	Rate per day.
1888.		
Aug. 31	P. F. Brennan	$5.00
	Jesse Kimball	5.00
Sept. 7	P. F. Brennan	5.00
	Jesse Kimball, brick-mason	5.00
	Ed. Brennan, brick-mason	5.00
14	P. F. Brennan	5.00
	Ed. Brennan, brick-mason	5.00
	Jessie Kimball, brick-mason	5.00
21	P. F. Brennan	5.00
	Ed. Brennan, brick-mason	5.00
28	Thomas Lannagan, stone-mason	5.00
	P. F. Brennan	5.00
	Ed. Brennan, brick-mason	5.00
Oct. 5	Thomas Lannagan, stone-mason	5.00
	P. F. Brennan	5.00
	Ed. Brennan, brick-mason	5.00
	Jessie Kimball, brick-mason	5.00
12	Thomas Lannagan, stone-mason	5.00
	P. F. Brennan	5.00
	Ed. Brennan, brick-mason	5.00
	Jesse Kimball, brick-mason	5.00
19	Thomas Lannagan, stone-mason	5.00
	P. F. Brennan	5.00
	Ed. Brennan, brick-mason	5.00
	Jesse Kimball, brick-mason	5.00
26	P. F. Brennan	5.00
	Ed. Brennan, brick-mason	5.00
	Jesse Kimball, brick-mason	5.00
Nov. 2	P. F. Brennan	5.00
	Ed. Brennan, brick-mason	5.00

FOUNDRY BRANCH (EAST) AND ROCK CREEK (WEST).

1888.		
June 29	Thomas Lannagan, stone-mason	5.00
July 13	....do	5.00
Aug. 17	....do	5.00
Sept. 7	....do	5.00
14	....do	5.00
21	....do	5.00
	James Lannagan, stone-mason	5.00

HOWARD UNIVERSITY.

1888.		
July 20	Kenny McClond, stone-mason	5.00
27	....do	5.00
	George Kendall, brick-mason	5.00
	Samuel Kendall, brick-mason	5.00
Aug. 3	George Kendall, brick-mason	5.00
	Samuel Kendall, brick-mason	5.00
	Kenny McClond, stone-mason	5.00
10	George Kendall, brick-mason	5.00
	Samuel Kendall, brick-mason	5.00
Sept. 14	George Kendall, brick-mason	5.00
	Samuel Kendall, brick-mason	5.00

HOWARD UNIVERSITY AND CHAMPLAIN AVENUE, (EAST).

1888.		
Aug. 10	James Lannagan, stone-mason	5.00
Sept. 21	Thomas Lannagan, brick-mason	5.00

BOOK NO. 3.—*P. F. Brennan. Time-book. October* 16, 1887, *to* ——— —Continued.

ROCK CREEK, CHAMPLAIN AVENUE, AND HOWARD UNIVERSITY.

Week ending—	Name and occupation.	Rate per day.
1888.		
Aug. 17	John F. Palmer	$5.00
	George Kendall, brick-mason	5.00
	Samuel Kendall, brick-mason	5.00

CHAMPLAIN AVENUE (EAST) AND ROCK CREEK.

1888.		
Aug. 24	James Lannagan, stone-mason	5.00
31	....do	5.00
Sept. 7	George Kendall, brick-mason	5.00
	Samuel Kendall, brick-mason	5.00
	James Lannagan, stone-mason	5.00
28	....do	5.00

Q. It appears in general from these time books, does it not, that the number of laborers employed during all these various weeks under these foremen, head masons, etc., varied from three or four or five up to fifteen and eighteen?—A. Yes, sir; that is all, according to the places they were working at. You will find in some of the time books, when they all get here, that sometimes they had thirty or forty laborers, according to the packing and what they had to do. You will find those time books correspond with the money charged up on our books.

Q. Did you state when you were here on Wednesday last whether you yourself saw anything of the working of the dry packing going on under that first contract?

The WITNESS. Did I see any of it?

The CHAIRMAN. Yes; when the contract called for dry packing; and did you see the work being done?

A. Oh, yes; I saw it being done.

Q. Did you ever see any of it being done imperfectly?—A. No, sir.

Q. Did any of your foremen or subcontractors, or anybody else, ever mention to you that any instance had occurred of imperfect work?—A. Not to my knowledge; no, sir.

Q. You have no recollection of ever hearing any complaint or suggestion of the dry packing?—A. Not to my recollection.

Q. Covering this 1,600 or 1,700 feet that you speak of doing, and when dry packing was the thing that was to be put in, I understand you to mean to say that you have no recollection of ever having heard from any source any complaint or suggestion of any part of it not being done rightly?—A. No, sir.

Q. Did you yourself see how the work was done at that largest place that had been filled in with timber, wood, etc.?—A. No, sir; I was not here at that time.

Q. Who was here representing your firm at that time?—A. Mr. Beckwith.

Q. Is Mr. Beckwith ill?—A. No, sir; he is at Herkimer, I think.

Q. And is able to attend?—A. I think so.

Q. Under this contract for dry packing, were you paid by the Government for all that your engineer, or foreman, or superintendent reported to you had been done?—A. No, sir.

Q. How much that was reported to you as being done, of the dry packing under the first contract, were you not paid for?—A. I couldn't tell that, Senator, from my recollection.

Q. Have you the means of stating it from your books?—A. Mr. Clark has. I think he has it in his note-books, and has his note-books here.

Q. Did you not charge up to the Government on your books, or keep some account of the totals, from week to week or month to month, of the packing that was done?—A. Yes, sir.

Q. Those entries would show how much your people reported to you of dry packing that had been done, would they not?—A. Yes, sir.

Q. Then your engineer's books will show, as I suppose, how much money you were paid on account of that packing, will they not?—A. Yes, sir.

Q. And that will show how much you had not been paid for?—A. No; we would not know from our quantity; we do not enter them; only the engineers keep them in note. We only keep on our books that which we want an estimate for from the Government. But I will state that no two engineers will go in there and take the same cross-sections and come out exactly alike. I have talked to one of the engineers, and he says there is not much discrepancy, taking it from one month to the other; that there is not much difference between his cross-sections and the Government cross-sections, taking it right through; that sometimes his exceeds and at other times the Government engineer's exceeds.

Q. Were you paid on all the Government cross-sections reported?—A. Yes, sir.

Q. Have you any papers from the Government engineer that were given to you or delivered to some of your people from time to time, showing the totals of these cross-sections and how much they amounted to?—A. We got our estimates——

Q. What do you mean by estimates in that connection?—A. The quantities figured up.

Q. You do not mean an estimate of something to be done and how much you are to be paid for it; but you mean, do you not, a statement from the engineer of how much down to that time, if the statement is correct according to his measurement, has been done?—A. Yes, sir.

Q. That is what you mean, is it not?—A. Yes, sir; and what they pay under those estimates.

Q. I think we asked you to bring, if you had them, the papers that would show the total amount of cubic space outside of the masonry lining of the tunnel—between it and the rock.—A. I stated to you that I could not state that at that time, but Mr. Clark could. After getting home from here that day I asked him what it averaged, and he said outside of the masonry lining it averages about 2½ or 3 yards, I think. But he is here to day, and will state that positively, and he has his note-book here also. You asked me at that time in regard to the distances that we were in the headings and the time we were ordered to put on an engineer. I could not state at that time. I afterwards got that information, and now I have got the distances. You also asked me whether these mistakes in regard to grades and lines happened before we got our engineer or afterwards.

Q. You can answer whatever you like on those points after having looked it up.—A. (From memorandum.) At Howard University we were at 7+62.

Q. East or west?—A. Howard University is west; we only have one heading there. At Champlain avenue east we were at 9+52; west,

8+28. Rock Creek east, 12+85; Rock Creek west, 15+36. Foundry Branch east, 11+92; Foundry Branch west, 12+15.

Q. That is the west shaft?—A. That is not the west shaft.

Q. No; but I asked you to tell us about the west shaft.—A. I haven't got that. The first engineer we had on was January 12, 1885; that was Charles Grosvenor.

Q. Did he come on when the headings were at the state you mentioned?—A. At those headings, yes, sir; and he staid until October 31, 1885. Then we had Porter, who came on November 1, 1885, and worked until February 23, 1886.

Q. What was his first name?—A. This memorandum does not give his first name. We only had one engineer by the name of Porter. After Mr. Porter went away we had Johnson, who worked only a very short time for us; he commenced the 25th of March, 1886, and resigned June 5, 1886. Then Mr. Clark commenced for us October, 1886, and has continued since.

Q. Now you may state whether these errors and crooks in cutting below grade, etc., occurred before or after your engineer took charge?—A. Before.

Q. Were there any afterwards?—A. Not to my recollection.

Q. Can you yourself explain how the Government engineers, when they from time to time laid these lines for you and before your engineers came, actually did it?—A. Well, they run a surface line, and plumbed down the shafts and got the line, and run in and followed that line.

Q. That we can understand; but when they got to where you were ready (you being a considerable distance in the tunnel) to go ahead, how did they point out to your men in what direction they were to go the next 100 feet, for instance?—A. They would give us a center line. It was dark in there, and we would hold our lamps. They would drive blocks in the bottom, and we would line from that block.

Q. That was your guide?—A. That was our guide.

Q. That divergence, then, from the true line might have happened, might it not, either from the engineer giving you the wrong guide by putting the marks in the wrong places, or from your departing from the line he gave you?—A. Oh, yes; there was liable to be an error in one way or the other. But I suppose the Senators understand from the first engineer the Government had there were a variety of lines. The headings would not have holed within 12 or 15 feet if they had been continued in the same direction. Just what time that was I don't know; I don't know what time they ran the new lines, when Mr. Coryell came in.

Q. Do you mean to say these errors in line and in grade that have been spoken of, and about which the engineer wrote you once or twice, as I see from the correspondence, arose from that fact, that they had to change the line because the headings would not meet? Or did it arise in the progress of following the line they meant to have you follow, either on account of the error in the engineer not giving you the right one, or from your workmen departing from the right guide?—A. I think the great trouble was that they did not give us lines often enough, and that was the point of it, anyway.

Q. How far would you go from one established guide, say, before you would wish to have another?

The WITNESS. Before we wished to have another?

The CHAIRMAN. Yes; before you gave notice that you wanted further guide marks.

The WITNESS. I couldn't state that part of it. That would have to come from the foreman and superintendent, more particularly.

The CHAIRMAN. The line was generally a straight one, was it not?

The WITNESS. Generally what?

The CHAIRMAN. Generally intended to be straight?

The WITNESS. Oh, yes.

Q. So that, so far as the plan was concerned of where it was intended to go, there were no angles or crooks at all?—A. Not intended to be; no, sir.

Q. In that case skillful workmen could go much farther on one set of guides?—A. They could in regard to the line go farther than they could in regard to the grade; it would be rather more difficult for them to distinguish the grade than it would be the line.

Q. Now, we will come to the change of arrangements in regard to the packing that took place under the first supplemental contract. You had the same subcontractors, Brennan & Emory?—A. Yes, sir.

Q. And Palmer?—A. No, sir; the first subcontractors were Emory & Brennan.

Q. When did Palmer come in?—A. He came in under a new contract.

Q. After the dry packing business was abandoned?—A. Yes, sir; and I think we had laid the last before suspension on account of the exhaustion of the appropriation; that was something over 8,000 feet, with dry mortar.

Q. Emory & Brennan continued their subcontract with you under the new arrangement as to the packing and masonry, the same as before?—A. Until the final settlement.

Q. Until what time, as regards date?—A. We received our final estimate January 24, 1888. They continued until that time, and then we settled with them.

Q. And they were subcontractors no more?—A. No, sir.

Q. Were they still on the work?—A. No, sir; they were not. Mr. Brennan afterwards took a contract with Mr. Palmer under the new contract.

Q. Then Emory went out and Palmer came in with Brennan?—A. Yes, sir.

Q. And Brennan & Palmer continued as subcontractors under you for the same purpose that Emory & Brennan had, did they not?—A. Yes, sir.

Q. And at the same rate or on the same terms?—A. No, sir; it was a different class of masonry. This last contract was rubble side walls, brick arch, and rubble packing.

Q. What were the terms of that contract?—A. The side walls were $1.50 a cubic yard and the packing was $1.25.

Q. And the brick masonry?—A. Two dollars and seventy-five cents.

Q. Have you that contract?

Mr. PERRY. I have it at my office.

The CHAIRMAN. Are you willing to produce it?

Mr. PERRY. Yes; certainly.

The CHAIRMAN. I wish you would produce those contracts. Of course we do not want to keep them; we merely want to compare them with the statement of the witness.

Mr. PERRY. I will go down to my office and get them now, if you wish.

The CHAIRMAN. It is not important.

Mr. PERRY. I will bring them Monday morning, then.

Q. Under this arrangement, beginning with the time of the rubble

packing, when it was Emory and Brennan, and continuing down to the time that Emory went out, did you have any superintendents to watch their operations?—A. Our superintendents were instructed by me to look after the masonry. All our workmen that were working directly for the company were instructed particularly to see that the work was done according to the specifications.

Q. Did you give the names of those superintendents?—A. I gave them to you the other day.

Q. From the time you began the rubble packing down to the time that Emory went out, did your superintendents or any of the other people employed by you ever report or mention anything to you in regard to any imperfect packing or the want of packing?—A. Yes, sir; they reported to me when they received an order from Lieutenant Townsend. I was away then building some water-works in New York, and Mr. Leroy wrote to me immediately about there being some poor work done.

Q. That was at the time when Lieutenant Townsend communicated to you, and Leroy got the communication, I suppose, as to the fact that he had found some imperfect packing?—A. Yes, sir.

Q. Before that time had you ever been informed or heard in any way that there was any imperfect packing at all?—A. No, sir.

Q. None of your superintendents or men or anybody else had ever mentioned to you that there was any question that everything had not been done right?—A. No, sir.

Q. Even a little instance?—A. No, sir; not to my recollection at all.

Q. You knew, I suppose, from your long experience in work of this general character, that everything depended on the contract being perfectly fulfilled in regard to that packing, did you not?—A. Yes, sir; I did. I thought I had taken all necessary pains to caution our men about the importance of looking after this work.

Q. How often during the time I am now speaking of—from the time the new style of work began until Emory went out—did you yourself or did Mr. Beckwith go into the tunnel?—A. I haven't been in there very often lately; I couldn't say how often. I had orders from my doctor that it was better for me to keep out, and for that reason I have not been in so often. I used to go in two or three, or three or four times a day every day in each shaft, but for the last two or three years and a half I have not been in so often.

Q. You were not in so often during the new arrangement?—A. No, sir; I was not.

Q. Was Mr. Beckwith?—A. Mr. Beckwith has not been here much for the last two or three years.

Q. So that you relied upon your superintendents?—A. No, sir; I did not. I relied more particularly on the Government inspectors.

Q. Why did you rely more on them than you did on your own men, whom you had instructed so carefully?—A. Because it was their sole business to see to it. I not only cautioned our men, but I cautioned the Government inspector, Colonel Kirlin, to select good men, and then watch the men to see that he kept them good, knowing the importance of the place where the work was being done, and that there was such an opportunity for men to shift, to do poor work. Then the fact that there was poor work done in New York had caused me more anxiety about watching here, so that there should be good work done here.

Q. What work in New York do you mean that stimulated your anxiety?—A. I mean the aqueduct work there.

Q. You are on that work yourself?—A. I am interested in that with Brown, Howard & Co.

Q. Did you have any personal supervision of that work at New York?—A. No, sir; we did not have.

Q. But what you heard about imperfect work there had stimulated your anxiety in regard to the work here, as I understand you?—A. Yes, sir; that was one cause of it; and then knowing the class of work, that there is such a chance for men to be lazy and neglect their work, and the difficulty of doing the work where it is done, up overhead in the smoke, and everything which induces men, where they are inclined to be lazy, to get out of it.

Q. Although they were paid by the day?—A. They were paid by the day, yes, sir.

Q. And if they slighted their work or left places not filled they would appear to do a larger day's work than they really had not?—A. That is it.

Q. Did you caution Emory & Brennan in the same way?—A. Yes, sir.

Q. And they were expected to be actually on hand, were they not?—A. They were expected to look particularly, and they had foremen under them to look after the work to see that it was done right.

Q. And I see from these time-books that Emory was actually a mason himself?—A. Yes, sir; a mason. They were all masons, without it is Mr. Palmer.

Q. Brennan was, too, was he not?—A. Yes, sir; he was a mason.

Q. And they were actually on the spot, as I see from the time books?—A. Emory was more in charge. Brennan had rheumatism and some trouble with him so that he did not dare to go down into the tunnel a portion of the time. He attended to the work more particularly on top. I am speaking now of the first work.

Q. Under this new arrangement with them, when the plan of packing and masonry was changed, when you stated the prices they were to have, I suppose you meant that that was for the labor, etc., and you were to furnish the material?—A. We furnished everything except their own tools; we furnished the plant and the scaffolding and everything of that kind.

Q. In regard to transactions with Emory & Brennan, and with Brennan & Palmer, did you ever make them any allowance or advance beyond what the contract called for?—A. No, sir; I thought their contract was very liberal.

Q. So that you mean to say that in your transactions with them they received no money from your firm or out of your firm's funds that they did not appear to be entitled to by the terms of their contract.—A. No, sir; the last work that they were doing, Mr. Palmer and Mr. Brennan both received $5 a day each week, and their work was not measured up by the Government; but, then, from my report it don't show that the work was paying that much; but then they had a credit upon the books, so that it justified them—that is, a percentage—until this bad work was discovered.

Q. Then they got $5 a day from you under the subcontract?—A. Yes, sir; they received $5 a day each week, the same as any laborer did.

Q. What did they receive that for?—A. Well, for supporting themselves; they had families to support, and they had to have money to support them with.

Mr. RYAN. I suppose what you want to know, Senator, is whether that was to be subtracted from their contract.

Q. Was that merely an advance on their contract?—A. Yes, sir.

Q. So that when you settled with them that $5 a day you had given would be charged up against the money they had earned under their contract?—A. Yes, sir.

Q. I understand you to mean, then, that in no way did Brennan & Emory, when you came to the end of the operations, receive from you or from the funds of your firm, any money or any other benefit than what the contract gave them.—A. Not any; no, sir.

Q. When Mr. Palmer came in and Mr. Emory went out, he came in on the same terms, did he? It was merely a change of person, was it not?—A. No; it was a new contract entirely. We settled under the first contract with the subcontractors and paid them their percentage.

Q. What do you mean by percentage?—A. We retained 10 per cent. from them, the same as the Government retained from us, and when the Government paid us our 10 per cent. then we paid them theirs.

Q. That was the very first contract of yours with them?—A. No, not the very first; it was previous to the last one.

Q. When the Government paid you, then, for the work you did under your second contract, you settled with Brennan & Emory, or Palmer, which ever it was?—A. Emory & Brennan; yes, sir.

Q. You paid them all that they were entitled to under the contract?—A. Yes, sir.

Q. And paid them that 10 per cent. that you had reserved?—A. Yes, sir.

Q. Did you pay them or allow them in any way anything more than what your books showed they were entitled to under the contract?—A. No, sir.

By Mr. RYAN:

Q. That included, I suppose, all the work up to the time of the resumption, all under the first and second contracts?—A. Yes, sir.

By the CHAIRMAN:

Q. About what time was that? Fix the date, if you can.

Mr. PERRY. I will produce, also, the receipts from Major Lydecker and the subcontract for January, 1888.

A. We cleaned the tunnel for the acceptance of the work, Champlain avenue and all; we have the date for that. They ordered us to clean out and take out the tracks, so that if Congress saw fit to re-advertise the work there would be nothing in the way of obstruction. So we cleaned Champlain avenue east July 23 to August 26, and Howard University west and Champlain east from October 5 to November 30. That was in 1887. Then, under the final contract, the percentage was paid, as I stated before, January 14, 1888, and after that time we paid Brennan & Emory.

Q. Then about that time you received from the Government your final payment under your second contract?—A. Yes, sir; they retained from us as a guaranty or pledge, so that if the work was re-advertised and other contractors got it, 15 per cent. of the 10 per cent., which amounted to $13,000 and something.

Q. That was finally paid to you when you got this third contract?—A. No, sir.

Q. They have that yet?—A. We never asked for it.

Q. So that the Government now holds, according to your understanding, 15 per cent. of the 10 per cent. reserved under your second contract?—A. Yes, sir.

Q. Other than that they paid you up, did they?—A. They retained 10 per cent. every month.

Q. Yes, but you say you settled up?—A. Yes; we have some claims that we claim is good, although the Government says that they have paid us all that we are entitled to.

Q. And according to the claim of the Government under this second contract you have received the whole amount of pay excepting 15 per cent. of the 10 per cent. that they had reserved under the contract?—A. Yes, sir.

Q. And that 15 per cent. of the 10 per cent. amounts to about $13,000?—A. I think it is between $13,000 and $14,000.

Q. At that time, when you substantially settled the second contract, had you heard of any imperfection in the work at any time?—A. No, sir; none at all.

Q. No Government engineer or inspector had called your attention to any imperfection?—A. No, sir.

Q. Can you state, right in that same connection, how much in distance altogether had been lined?—A. I couldn't state exactly.

Q. About, in round numbers?—A. Between 8,000 and 9,000 feet.

Q. Almost half of the whole length of the tunnel?—A. Almost half, yes.

Q. And that 8,000 or 9,000 feet was distributed in two or three or four different places, I suppose?—A, Yes, sir.

Q. It was not all one continuous line?—A. No, sir.

Q. In computing the amount of packing around and over the masonry lining of the tunnel, under this second contract, which was settled in the way you have described, did your claims by cross-section and the Government payments substantially correspond?

The WITNESS. You mean this last contract?

The CHAIRMAN. No; I do not mean the very last one; I mean the one you substantially settled up in January, 1888.

The WITNESS. No, I said generally, taking it from one month to the other; sometimes they exceeded, and on one month's estimates from the Government they fell short of ours by some 600 yards. We made a complaint to Major Lydecker about that, but we never had any correction of it. They relied on some of the inspectors or helpers, or somebody taking cross-sections, and they had a new engineer there, and we fell short, but we didn't get any satisfaction from them.

Q. Do you know what month that was?—A. No; I couldn't tell you the month.

Q. Was it in the year 1887, under the second contract?—A. It was under the second contract. Mr. Clark knows that, and he has the cross-sections.

Q. That difference between you and the Government people as to the amount of packing that you had done arose from what circumstances; from the measurements of the engineers in cross-sections of the tunnel?—A. I think these were taken by the inspectors or the help or some new engineer that took it; I couldn't tell who it was, whether it was Mr. Smead, a new engineer on the reservoir, or whether they had taken it from the inspectors.

Q. Did the Government engineers or inspectors contend that you had not filled up with packing according to the contract in part of the cross-sections of the cavities to make that difference or any part of it?—A. No, sir.

Q. It was merely a difference in measurements or computations on the same data?—A. Yes, sir,

Q. And there was no question as to the quantity that you had actually done as it regards filling as far as you went?—A. No, sir.

Q. Aside from that difference that month, was it substantially true that you were paid for filling the whole cavity outside of the masonry lining?

The WITNESS. For backing?

The CHAIRMAN. Yes.

The WITNESS. Yes, sir.

Q. Now we will come to the third and last contract. You began operations under that in the spring of 1888, I suppose, did you not?—A. Yes, sir.

Q. About what time?—A. We commenced soon after the appropriation was made for this last contract. I left out some of the names of superintendents when I was giving you the names before. If you recollect, you asked me the number of superintendents, and I forgot some of them, but I afterwards got the names of them.

Q. You may now give me the names of the other superintendents that you did not mention the other day.—A. I believe I gave you Noe and Douglas; then I did not mention Peter McEntee.

Q. Where does McEntee live?—A. He is now at work for us in New York.

Q. New York City?—A. Yes. He is at work for this Charles Petersen & Co., who is a partner of ours in New York City.

Q. What would be the address where a letter would find him?—A. He is on One hundred and twenty-fifth street; a letter addressed to anywhere on One hundred and twenty-fifth street would reach him; I haven't got the number now.

Q. Have you given us the names of all your superintendents?—A. There is Ed. Broughton and John Canty.

Q. Where is Ed. Broughton?—A. He is here in West Washington.

Q. Do you know his number?—A. No, sir; our office will catch him.

Q. Give us the name and address of the others?—A. John Canty and H. S. Coffey.

Q. Where does Canty live?—A. These men were all foremen of headings, shift bosses of the excavation.

Q. All these that you have now named?—A. Yes, sir.

Q. Give us the names again of your superintendents, whose duty it was, and whose instructions were, as you have stated, to watch the progress of the lining and packing work?—A. Patrick Haley and A. W. Leroy.

Q. Where does Haley live?—A. He is at work for us now; his address would be at our office. Mr. Leroy is out in the hall here now with the books. He is our paymaster and superintendent on the western connecting section.

Q. They are both here in your employ?—A. Yes.

Q. Now we will go on with the last contract that you began work on. Your subcontractors there were Brennan and Palmer?—A. Yes, sir.

Q. Did you ever hear from them or from your superintendents, of any imperfection in the work done under that contract?—A. Yes, sir; last July. I have stated that before. Last July I heard something when I was away. Mr. Leroy wrote to me about it.

Q. Mr. Leroy wrote to you, as you stated, that Lieutenant Townsend had notified him?—A. Yes, sir.

Q. But other than what came from the Government engineer, did your superintendents or foremen or anybody else ever communicate to you at any time any fault?—A. They notified me of this work. They

heard of it before Lieutenant Townsend did. So that they notified me of it.

Q. How did they notify you?—A. Mr. Leroy wrote to me.

Q. That was a different letter, then, from the one you have already spoken of, was it?—A. Yes, sir; after he received this notification, then he wrote me another letter in regard to receiving notice of it.

Q. Have you those two letters?—A. No, sir.

Q. Where are they?—A. I burned the letters up.

Q. Did you burn them?—A. I think I did; I don't keep all my correspondence.

Q. When did you burn this up?—A. I generally carry them in my pocket sometimes a month or two, and get my pocket full of old letters, and then burn them up. I don't know any particular time, Senator, when I burned them up.

Q. Those two letters struck a pretty important point, from what you have before said, about your knowledge of the risk of bad work?—A. This was the same occurrence with that.

Q. And still you burned the letters?—A. I think so.

Q. Does Mr. Leroy or anybody keep a letter-book in your office?—A. He does, of all business letters of importance. We have a letter-book, but Mr. Davis, the book-keeper, generally does all the correspondence.

Q. You have a regular business letter-book kept at your office here?—A. Yes, sir.

Q. And you say Mr. Leroy wrote you two letters in July; the first one spoke of his having learned otherwise than from the engineers of some trouble about the packing?—A. Yes, sir; he said he had learned that there had been some bad work done at Rock Creek and some at Foundry Branch.

Q. How long after he wrote you the first letter did he write you the second one, stating that Lieutenant Townsend had communicated on the subject?—A. He wrote to me and said that he had received a letter from Lieutenant Townsend; I don't remember whether it was one or two or three days after.

Q. Was it very soon?—A. It was very soon after this; I think it was the second week.

Q. Should not those letters of Leroy appear in your business letter-book?—A. No, sir.

Q. And, as important as they were, you destroyed them?—A. Well, I didn't think them important. I thought those letters that were received from the lieutenant were important, and they were kept on file; and then the letter of Mr. Buell, our consulting engineer, in answer to the lieutenant's letter, I thought that was important.

Q. Did Leroy state to you in his first letter how he had heard of this bad work at, I think you mentioned, two places?—A. No, sir; he didn't. I don't think he did. I don't pretend to recollect exactly the letter or the words; I couldn't say as to that.

Q. All that you can remember his saying then, if you have stated it all, as I dare say you meant to, was that he had heard of some bad work in the packing?—A. Yes, sir.

Q. And he mentioned two places?—A. Yes, sir.

Q. What places were they?—A. I couldn't state the stations.

Q. The shaft?—A. It was at Rock Creek and Foundry Branch.

Q. And you say on getting his second letter, referring to what Town send had communicated, it was the same two places?—A. Yes, sir.

Q. What did you do about it?

The WITNESS. What did I do about it?

The CHAIRMAN. Yes.

A. I wrote to him, and said to him that he should have Mr. Buell or some of them answer the letter to the lieutenant, and see that it was corrected immediately and that these men were discharged for neglect of duty.

Q. You wrote that to Leroy?—A. Yes, sir; or to that effect.

Q. Do you know where that letter is?—A. No, sir.

A. Should it not be in your files up at your office?—A. No; that was written to Mr. Leroy. I don't think it would be in our files.

Q. Mr. Leroy was your superintendent?—A. Yes, sir, he was our superintendent; but I don't think he kept a file of my letters.

Q. Was there any other instance, under this last contract, in which your own superintendent or any other employé of yours communicated to you any imperfections about this work?—A. No, sir.

Q. And down to that time you yourself had ceased to go into the tunnel much for purposes of inspection?

The WITNESS. How is that, Senator?

The CHAIRMAN. Down to that time, in July, 1888, while the work was going on under the last contract, you had ceased as a usual thing to go into the tunnel to watch operations yourself?—A. Yes, sir.

Q. And relied entirely upon the Government people and your own?—A. Yes, sir.

Q. And Mr. Leroy was one of them?—A. Yes, sir.

Q. When did you next hear of any imperfection in the work after this event in July, which you have mentioned?—A. The first I heard was the report of the Kendalls.

Q. The one that was printed in the newspapers?—A. Yes, sir.

Q. After having got this information from Leroy about the event in July did you take any new measures of protection in regard to watchfulness and care in the doing of the work?—A. I spoke to Mr. Clark and Mr. Leroy, as well as to Mr. Haley, and asked them how it could be possible that this work could be done in that way and they not see it. We had no interest——

Q. I am not on the question of your interest. What did they say in answer to your inquiry?—A. They went on to point out the difficulties in detecting it.

Q. What did they say were the difficulties?—A. They said the difficulty was that every time they passed along the scaffolding they had to climb up there and examine it, and the men that were there could take advantage of that and have it all in good shape when they were examining it, and without they staid there exclusively and did nothing else there was an opportunity for them to do bad work.

Q. Did they go in at regular times to inspect and see how things were going on?—A. Yes, sir; they were passing, and they had their duties to perform in regard to the excavation and everything; they had those duties to attend to.

Q. Would the masons and packers know when Leroy and Clark were coming in?—A. No, sir.

Q. Then, how could Leroy and Clark help seeing some of them at their bad work if they came on them unexpectedly, and when the masons and packers were trying to do bad work so often?—A. I have mentioned that very same thing to them exactly—the question you now ask me, not only once, but a great many times.

Q. What did they say when you mentioned that to them?—A. Well, they would say that they never did detect it; that they were always

doing their work well when they would go there. How they done it I can't explain any more than you can.

Q. You can not explain it?—A. No, sir; I fail to.

Q. Can you think of any theory of explanation consistent with your people doing their duty?—A. No, sir; I have got no excuses at all to make, and I can't see any reason why they shouldn't have seen it.

Q. Did these Government inspectors or subinspectors—any of the Government people—aside from the instance you have mentioned of Lieutenant Townsend, ever communicate to you in any way their having discovered any imperfect work?—A. No, sir.

Q. What did you pay your superintendents?—A. One hundred dollars a month.

Q. And what did you pay your engineer?—A. One hundred dollars a month.

Q. That includes Mr. Leroy, also; that is his salary?—A. Yes.

Q. That has been the regular pay all the time?—A. Mr. Leroy only got $75 a month one spell.

Q. Did you ever pay any of these superintendents or engineers anything extra?—A. No, sir; I don't know as I ever made them a present of anything; I don't recollect as to that; I don't think I did.

Q. And did you ever allow them in any way anything for expenditures for incidental matters that they had made?—A. If they would pay anything out, certainly; but they would report that to the book-keeper, and he is a very far-seeing old gentleman, and if he thinks it is all right he allows it to them.

Q. Has that book-keeper got back?—A. No, sir.

Q. When is he coming?—A. I told him that we were not very anxious for him to come back now, and he could stay with his family until we let him know.

Q. Where does he live?—A. In Utica.

Q. Have you any recollection as to the book-keeper allowing them money for incidental expenses?—A. Oh, I think so; I think there is cases where they had money that they were entitled to for some expense or other; I have no doubt of it.

Q. Would that all be itemized in vouchers?—A. No, sir; it would be just written up "Expense" so much—Mr. Leroy, or Mr. Haley, or Mr. Clark, or whoever it went to.

Q. It would be just written up "Expense?"—A. Yes, sir.

Q. Have you your account books here now?—A. I think they are out in the hall.

The CHAIRMAN. Please bring them in.

The WITNESS. Shall I tell Mr. Leroy to bring them in?

The CHAIRMAN. Yes, he can bring them in.

[The witness and Mr. Leroy brought the books into the committee-room.]

The WITNESS. Which books do you want?

The CHAIRMAN. Open to your expense account, if you kept such an account as that.

Q. Does this expense account include payments on your subcontracts?—A. No, I think not.

Q. And all these incidental expenses?

Mr. LEROY. Yes, sir.

The CHAIRMAN. Did you keep an individual account with Mr. Clark?

Mr. LEROY. That is entered up in the salary account.

The CHAIRMAN. Did you keep an individual account with Mr. Leroy?

Mr. LEROY. That is in the salary account.

The CHAIRMAN. Now open to the salary account. This ledger merely shows the figures and references to the journal?

Mr. LEROY. Yes, sir.

The CHAIRMAN. Is there not any account for the superintendents and engineers which shows in one place or under one heading the sums that were paid to them for their salaries from month to month?

Mr. LEROY. No, sir; I am pretty sure there is not.

The WITNESS. Mr. Beckwith and myself both received a salary of so much per month.

Mr. PERRY. I would like to know whether or not that expense account relates simply to the contract here or to the whole business of the firm.

The WITNESS. I think this refers only to the business of the firm, don't it—the different expenses of different works?

The CHAIRMAN. Do these accounts all refer to work that has been done in the District of Columbia?

Mr. LEROY. I couldn't say positively whether there is anything in here for work done outside of the District of Columbia or not, but I think there is.

The WITNESS. I think only part of the expense of our work here has been charged up there; isn't that so?

Mr. LEROY. I couldn't say.

The WITNESS. I have the expenses that have been made on another part of the work.

The CHAIRMAN. What work?

The WITNESS. New York work or anything else that has been charged up.

The CHAIRMAN. Tell us the date when the expense account begins.

Mr. LEROY. You want the day of the month? It commenced in 1883.

The CHAIRMAN. Yes; we want the day of the month.

Mr. LEROY. November 22, 1883.

Q. Now, turn, Mr. Quackenbush, to the journal entry of that first date, and tell us whether it relates to this tunnel business or not.—A. That relates to this contract; yes: "Freight on six horses and three small wagons."

Q. Now, look along far enough, with the help of Mr. Leroy, if you wish it, and tell us whether that expense account relates to this Washington tunnel contract business or to something else.

The WITNESS. All through?

The CHAIRMAN. So as to satisfy yourself in general.

Mr. PERRY. State each item.

The CHAIRMAN. You can satisfy yourself in a little while whether there is anything else in it or not.

The WITNESS (after making an examination). You want to get an idea, Senator, of what is charged up to this expense account?

The CHAIRMAN. I want you to state—because Mr. Perry does not seem to be quite contented without our seeing it all—whether that expense account relates to this tunnel business or to something else; and when you get ready to answer you can.

Mr. PERRY. It would save time perhaps to let him answer as to any item you want to inquire about. If it should appear that they relate to the New York contract or any other improvement, there the inquiry can be dropped. But I have no objection to his making any answer as to any items you want to inquire about which are connected with this contract.

The CHAIMAN. I do not want to know about any others.

Mr. PERRY. I know it; but my understanding is that that book embraces the expense account of the firm as to all of its business. Of course that you do not want to inquire into; but if there are any items you want to inqure into, I am willing.

The CHAIRMAN. The first thing I want to know is whether that does embrace all the business of the firm, or anything else except this Washington business.

Mr. PERRY. That he does not appear to be able to answer without going through the items.

The CHAIRMAN. He can state generally.

Mr. PERRY. If he kept his own books, he could perhaps.

Mr. LEROY. There are some private accounts in this book, Senator, charged up to expense.

The CHAIRMAN. Not relating to tunnel business?

Mr. LEROY. Yes, sir.

The CHAIRMAN. Please look far enough so as to be able to tell whether it is about this business, or generally about something else.

The WITNESS. It is generally about this business I should judge. [After further examination.] There are some different expenses charged in here, I see, where we built some houses.

Q. Built houses where?—A. Here in Washington.

Q. Connected with the tunnel work, for your workmen, or private enterprises?—A. Private enterprises.

Q. Do you find anything that relates to anything outside of the District about other business operations at other places?—A. Yes, sir. We built a lock last winter in New York, and I see some charges for that; we built a lock on the Erie Canal last winter in New York, and that is mixed up with these accounts here.

Q. You have not, then, any expense account which is devoted to the tunnel business exclusively?—A. No, sir; this is all the expense account we have got.

Q. Did you keep any individual accounts with your superintendents, engineers, and book-keepers, etc.?—A. I understood Mr Leroy to say there wasn't any.

Q. You can state your understanding, because I want to have this your testimony.—A. From looking over, I understand that there is not. It is very easy to find out by looking over it. [After further examination.] It is charged in to expense.

Q. The salaries of the book-keepers, engineers, and superintendents are charged to salary account, are they not, Mr. Quackenbush?—A. I think they are; yes, sir.

Q. Then they would not appear in the expense account proper, which, I understand you to say, were incidental and extraneous expenses.—A. I see that Mr. Davis has got Mr. Clark's salary charged in the expense account. I see that he hasn't got any separate account here.

Q. Yes; but you say that Mr. Clark's salary is charged up to the expense account?—A. No; it is salary account.

Q. If it is charged to salary account it does not appear in the expense account too, does it?—A. No, sir; I think he charges the whole salary account right into the expense account, but he keeps two separate pages.

Q. The expense account appearing in that ledger amounts to about $56,000 during the whole business, does it not?—A. Yes, sir.

Q. You understand that all the salaries of these employés of yours

that you have been mentioning, superintendents, engineers, etc., go to make up that $56,000?—A. No; here is a salary account of $66,157.50.

Q. And the expense account is $56,000 and upwards, is it not?—A. Yes, sir.

Q. Do you mean to say that any part of the sums that appear in the salary account are charged also to the debit of the expense account?—A. No, sir; it is not at the present time.

Q. Has it been, as appears on the books?—A. No, sir.

Q. Did you keep any individual account with any of the superintendents?—A. My information is, that Mr. Leroy and Mr. Davis are the only two.

Q. Only two what?—A. They have an individual account on the ledger.

Q. You kept individual accounts with them?—A. Yes, sir.

Q. Turn to those individual accounts. I understood you to say a while ago that there were none?—A. Well, the book-keeper says there are those two.

Q. The individual account of Mr. Leroy begins in December, 1883, it appears; at what date does it appear in the journal?

Mr. LEROY. December 8, 1883.

The CHAIRMAN. And comes down to date, I suppose?

Mr. LEROY. Yes, sir.

The CHAIRMAN. And the total debit of the individual account of Mr. Leroy is what?

Mr. LEROY. That has not been extended. I see that runs from 1 to 36, and then runs to the new ledger. The book-keeper has balanced it at different intervals. Here is a balance for part of 1886, and here is another for part of 1887.

Q. Mr. Quackenbush, you have said that the incidental expenses which the superintendent and other people in your employ would pay out, as I understood you, would be brought to the book-keepers and charged to the expense account. Now, in the case of Mr. Leroy, for instance, when he, aside from his salary, had to expend something for incidental expenses, was that credited to the account of Mr. Leroy, or was that carried to your expense account, as I understood you to state before?—A. I understood it would be charged into the expense account; I don't know positively about that. Mr. Leroy will know positively.

The CHAIRMAN. You can converse with him and state what you understand from him.

The WITNESS (after conversing with Mr. Leroy). He says that in some cases he would receive credit, and then be charged with the money, and in other cases he would not.

Q. In the other cases it would be charged to the expense, I suppose, if you ever expected to have your books balance?—A. Yes, sir.

Q. From looking over your books and from your knowledge of these other little transactions you speak of, about building houses here in Washington, and building a lock in New York, what proportion of that $56,000 of expense account relates to this aqueduct business?—A. I can form no idea.

Q. Can you not form some idea of the extent of your house transactions here, so as to guess how much ought to come out in regard to your house transactions?—A. We have other transactions——

Q. I am asking you about house transactions now.—A. That is the whole amount of the house transactions.

Q. You know, of course, that I do not care about your private business, and do not want to talk about any such transactions, except to

try to separate in lump, to save time, the house transactions in this expense account from the tunnel transactions.—A. You see the difficulty of my answering that question, because I don't know what the bookkeeper charged to expense account, so that I am perfectly ignorant in regard to it and can form no idea about it, no more than you can.

Q. If you had only built one house of 25 feet by 30, you could guess whether the incidental expense account about that house would be $200 or $200,000?—A. Yes, sir.

Q. So you could guess about how much of incidental expenses in building houses here in Washington went into that $56,000, which is the total of your expense account?—A. I certainly couldn't say how much he charged to expense, or whether he charged it individually to building expenses. That is where I am ignorant about it.

Q. Then you would say the same about the New York lock?—A. Our laborers went there, some of them, from this work, and their time was kept right along. We paid them from this work, and so I can't tell about that. Our men here were doing nothing and we sought to get work elsewhere so as to utilize them.

Q. I understood you to say before, and I repeat the question so as to save us the trouble of hunting all through for items, that if your superintendents or engineers, or any of your head men who were authorized to make incidental expenses, made them, they would return the amount to the book-keeper, who, if he was satisfied that it was all right, would enter it in the proper account somewhere without a voucher?—A. Yes, sir.

Q. And so far as your knowledge goes, then, you are not able to state the amount or the detail of the particular incidental expenses relating to these tunnel transactions?—A. No; I can not.

Q. Did you ever have any disagreement with any of your superintendents or engineers concerning the amount they had expended for incidental expenses?—A. No, sir.

Q. And in fact, if they did not return any voucher and you did not examine the books and book-keeper in detail you could not say what their incidental expenses had been for, could you?—A. No, sir.

Q. Did you ever yourself pay any incidental expenses?—A. Yes, sir.

Q. Where would that be entered; in the expense account?—A. Yes, sir.

Q. Entered on a voucher or merely a report from you to the book-keeper?—A. No vouchers. I would tell the book-keeper what I had expended.

Q. I think you stated a while ago, in regard to the mystery about this bad work not being discovered sooner, that you had asked your superintendents, and so on, many times, how they could account for the fact that they had never seen all this mischief going on?—A. Since this work has been discovered; yes, sir.

Q. Had you any business transactions with Brennan or Emory or Palmer, or either of them, previous to this tunnel?—A. Mr. Brennan worked for us in Massachusetts.

Q. Was he engaged with you at the time he came on here and took this subcontract?—A. No, sir.

Q. I understood you to say also—though Mr. Perry will bring us the contracts, so that we can see them—that in those subcontracts, or the later ones about this masonry, etc., they were paid for the masonry by the linear foot?—A. Yes, sir.

Q. Cubic?—A. Cubic yards.

Q. Nothing was paid for by distance?—A. No, sir; we get paid from the Government that way, but these men do not.

Q. You get paid for the masonry by linear distance?—A. We get everything, trimming and all; for the enlarging of the tunnel and all we get so much a foot. This last contract is for so much a foot.

Q. So much a running foot?—A. So much a linear foot; yes, sir.

Q. So that it makes no difference in your compensation whether you have to put down five rings of brick rather than three in some places?—A. We have different prices, according to the masonry.

Q. According to the number of rings?—A. Yes, sir.

By Mr. RYAN:

Q. But it makes no difference about the packing?—A. No difference about the packing. We have three different prices, I think—$24.50, $28.50, and $40.

By the CHAIRMAN:

Q. Does that depend entirely on the masonry?—A. Yes, sir.

Q. Did your first contract give you time enough within which to do the work that you were engaged to do?—A. No, sir.

Q. Did you try hard to accomplish it within that time?—A. Yes, sir.

Q. Pushed things?—A. To the utmost of our ability, sir.

Q. On the second contract were you given time enough to accomplish what you had engaged to do?—A. No, sir. We also stated that to the major when we took the contract—that it could not be done.

Q. Why did you take it then?—A. Because there was no penalty attached to it. We would not bind ourselves to finish it; it was also in the first contract.

Q. Did you try to finish the second contract within the time?—A. Yes, sir.

Q. Did the second contract allow you to go on after the time if you did not accomplish it within the time?—A. No, sir.

Q. Then what you mean by "no penalty" is that while you were ready to go on with the contract to the end, there was no stipulated sum that you should pay for failure?—A. That is what I meant, yes, sir.

Q. There was no provision in the contract that you should not be liable for damages if you did not come to time, was there?—A. Certainly there is, and the stipulation says that we are to do it if we can, but there couldn't be any damages where there is no stipulation. I don't understand it so.

Q. Was it the same as to the third contract? Did that give you time enough to do what you engaged to do?—A. I couldn't say as to that; I don't remember.

Q. The third contract provided, I think, that it was doubtful whether you could do it by the 1st of November?—A. We were positive we couldn't do it.

Q. The contract referred to that fact, did it not?

The WITNESS. That we could not do it?

The CHAIRMAN. Yes; referred to the fact that you might not be able to do it, did it not?

A. I can not say whether the contract does or not, but I think it does.

Q. When you entered into the second contract had the time of the first one expired?—A. Yes, sir; I think so.

Q. And you had found, after the first one, the unexpected difficulties of keeping up to the time, had you not?—A. Yes, sir.

Q. So that you entered into the second contract with a knowledge of the difficulties in regard to the nature of the work.—A. I think the contract shows what we agreed to do; I don't recollect it now.

Q. My question was not what that contract was; my question was whether, when you entered into the second contract, you had a knowledge of the difficulties that surrounded the work?—A. Oh, certainly; we had experienced certain difficulties.

Q. And you knew, then, in the ordinary sense, what you would have to expect, would have to meet with in regard to the nature of the work under the second contract?—A. No; we wouldn't know that, because we couldn't tell what kind of material we would find; it was impossible to do that.

Q. Then, under the second contract, you were disappointed as to the material?—A. Yes, sir; because the character of the rock would change from one foot to the other.

Q. When you got to the third contract the holing was done, was it not?—A. The hole was done.

Q. Then, with regard to the third contract, you knew what the hole was, and the nature of the rock?—A. We knew what the nature of the rock was, yes, sir; and we knew it could not be done, and said so, but we thought we would do the best we could.

Q. (Referring to the contract of May, 1838.) You provided in the third contract that you would use all the means in your power to complete it by the 1st of November, and that you would do the best you could, as you say?—A. You understand that a man who is working in rock under ground can't tell what difficulties he is going to meet with, even if the hole is through, or what slip he has got to contend with.

Q. Slips I can understand, but what other difficulties are there that can not be foreseen?—A. The difficulties are that you can not pick up experienced men unless you can keep them employed all the time, and so you have got to take scrubs, because all the best men for the work, the regular tunnel men, may have secured work somewhere else, and so it would be very difficult to get them.

Q. That is a matter you could have foreseen just as much when you made the last contract as you can now, was it not, because it is a matter of common experience?—A. You realize the difficulties, but sometimes you have better luck than at others.

Q. But you know what chances you have to take in there; you have got to take the chances, but the matter of slips is an uncertain quantity. Did you have any slips on this occasion after you had holed through?—A. Some in Rock Creek in the last lining we had, but nothing serious.

Q. Your subcontractors were under the same stimulation for speed that you were, were they not?—A. Yes, sir.

Q. And the more they could get apparently done and paid for the better it would be for them in the final result, would it not?—A. I don't know about that.

Q. Suppose the deficiencies were not discovered, if they could apparently get the whole of the work done by the 1st of November, if they could line it all, they would have a motive to do that. would they not?

The WITNESS. The subcontractors?

The CHAIRMAN. Yes; those are the persons I am talking about.

The WITNESS. Yes, sir.

Q. If they would have such a motive, why would you not have?—A.

We had no motive because we were paid for good work, and our reputation was at stake, and we could take no chances.

Q. But you had the motive to have the greatest amount of work done that was possible?—A. It was not our desire to do anything but what was good.

Q. Oh, no; but I am now speaking about rapidity?—A. It is our anxiety to do all the good work we can and accomplish all we can.

Q. Have you paid Brennan & Palmer, the last contract people?

The WITNESS. The last estimate?

The CHAIRMAN. Yes.

The WITNESS. We haven't paid them any estimate since the Government ceased to pay us, but we paid their check-roll and paid them by the week, just the same.

Q. That is, you paid them $5 a day?—A. Yes, sir.

Q. And you paid their laborers?—A. Yes, sir; their check-roll.

Q. By check-roll you mean their pay-roll?—A. Yes, sir.

Q. How much is there behind apparently that you have not paid them under this last contract?—A. I couldn't say.

Q. In round numbers?—A. I should think we owed them about somewhere between $1,400 and $1,500.

Q. You have reserved the 10 per cent.?—A. Yes, sir.

Q. Does that include the 10 per cent.?—A. You see we have exceeded that.

Q. So that 10 per cent. and $1,400 or 1,500 would be all?—A. Yes, sir; I think that was all.

Q. But it was some small sum inside of $2,000?—A. Yes, sir.

By Mr. CLEMENTS:

Q. I believe you stated a few days ago that you had been about Washington and examined the work, so far as you could, before you entered into the contract?—A. We examined the croppings of the rock; yes, sir.

Q. Was Mr. Beckwith here?—A. Yes, sir.

Q. Were you here any time between the time of your proposal and the time you were notified that the contract would be let to your firm?—A. No, sir.

Q. Was Mr. Beckwith here within that time?—A. No, sir; not until after we received notice.

Q. Were any of these silent partners you named here the other day present during that time?—A. No, sir.

Q. Did you have any agent or attorney here, or anyone looking after your interests?—A. Not anybody; we knew nobody here.

Q. Did you have any communication with anybody connected with the engineer's office during that time?—A. No, sir; not until after we received the letter in regard to Mr. Deweese; that was the only letter in answer to that. It was reported that they had made arrangements with us for our plant, and the engineer department—I don't know who it was wrote to us to inquire whether that was true; that was the only letter I think that was written.

Q. If I understood you correctly a moment ago, you said that when the contract was made you knew that you could not perform the work within the time specified; am I correct about that?—A. Not the second; that was the third one.

By Mr. MCMILLIN:

Q. You say that you knew that you could not fulfill the third contract within the time?—A. We thought so.

Q. I believe these subcontractors were paid by the cubic yard, were they not?—A. Yes, sir.

Q. Hence, the more they did within a specified time the more they got paid for?—A. Yes, sir.

Q. Who did I understand you to say was with you in the New York contracts?—A. Charles Petersen.

Q. In whose names were the biddings?

The WITNESS. Where; in New York?

Mr. MCMILLAN. Yes; in that contract.

The WITNESS. The contract for the work in New York was taken by us for Clark & O'Brien. We made a bid on that work there, but we didn't get it.

Q. You were not the successful bidders?—A. No, sir; the work was not awarded to us.

Q. Then you took work under the successful bidders?—A. Yes, sir.

By the CHAIRMAN:

Q. What O'Brien is that?—A. Clark & O'Brien; John O'Brien.

Q. The same O'Brien who was about this work?—A. Oh, no; there hasn't been no O'Brien about this work that I know of.

By Mr. MCMILLIN:

Q. There was an inspector by that name, was there not?—A. Oh, yes; Tom O'Brien; I didn't think of him.

By the CHAIRMAN:

Q. They are not the same person?—A. Oh, no, sir.

Mr. PERRY. I wish to state in that connection that the military court of inquiry supposed that the subcontractor, or rather the contractor connected with the reservoir, was the same man as his partner, Petersen; it is another man entirely. There was a man named Petersen who was connected with the reservoir contract here, but it is not at all Mr. Quackenbush's partner; it is another man.

By Mr. MCMILLIN:

Q. I believe you stated that you did not know whether or not there was any relationship existing between the Lucas mentioned by you as one of your employés and Lorenzo A. Lucas, the subinspector?—A. No, I didn't know; but when the Senator referred to that Thomas Lucas—I remember his first name—I remember that it is the old gentleman's name, and I think this was his son.

Q. The subinspector was his son?—A. No; the foreman was the subinspector's son, working for Brennan & Emory; I think so. But this same foreman was afterwards inspector for the Government—that is my recollection—in Champlain avenue.

By the CHAIRMAN:

Q. Did you pay, on any time-books, or in any other way, anything extra to these subinspectors for overtime?—A. No, sir.

Q. I do not mean you personally, but was there paid out of your funds and in your accounts?—A. Not to my knowledge.

Q. Did you ever hear or know of any of these subinspectors or inspectors being paid for overtime by anybody?—A. I have heard so; yes, sir.

Q. When did you first hear so?—A. I couldn't tell that.

Q. Think it over and tell us as nearly as you can.—A. I couldn't state when it was, what month or what day or what week. I have asked in regard to that.

Q. Was it before or after the last contract?—A. I think it was after the last contract. I think I am justified in saying that I heard that if they wanted the inspectors to work overtime they had decided that the subcontractors must pay them; that if the subcontractors wanted to work overtime they must pay the inspectors for working overtime, because they couldn't work without the inspectors.

Q. Did you understand that at the time of it?—A. I couldn't say whether it was at the time of it or afterwards.

Q. Did you hear of it before the work stopped?—A. Yes, sir.

Q. Did it occur to you or not that that was a very unsafe operation in regard to faithful inspection?—A. No, sir; it did not. If the men were honest and did their duty it would not make any difference.

Q. You thought it was a perfectly correct transaction?—A. I thought it was perfectly just where all parties were knowing to it.

Q. If you had work to be done for yourself, as in building an expensive house, would you be willing that your superintendent or architect should be paid anything by the contractor, under any circumstances whatever?—A. I think I would if they worked overtime.

Q. You think it is a correct transaction in and of itself, then, do you not?—A. As a general rule I think not.

Q. I have asked you about anything being paid for overtime, or you knowing of it or hearing of it. Did you ever hear of any of these Government people being paid for keeping time of the men who were at work under the subcontract?—A. I have heard since this investigation began of their keeping overtime.

Q. I am not speaking of overtime now.—A. I mean keeping time.

Q. Had you heard of it before?—A. I had heard of it before.

Q. What do you think of the propriety of a transaction of that sort, as a matter of safety?—A. I do not approve of it.

By Mr. RYAN:

Q. Do you refer to the Government inspectors of this work?—A. Yes, sir; that is what we are speaking of.

Q. As having been paid for keeping time?—A. I have heard of one case; yes, sir, since this investigation has been going on in the court of inquiry.

Q. Paid by the subcontractors?—A. Yes, sir.

Mr. PERRY. Mr. Chairman, I would like to have the witness asked as to how much cement actually went into this work, and also as to whether or not he paid the subcontractors for the work that they actually did by the cubic yard, so that they got the same pay from him for perfect work as for imperfect work.

The CHAIRMAN. As to the last item he has already stated; as to the cement he has not.

Mr. PERRY. That appeared in the testimony before the court of inquiry, and I think he is entitled to it here.

By the CHAIRMAN:

Q. How much cement did you put into and use in that tunnel?—A. This last contract it was 23 per cent.

Q. Twenty-three per cent. of what?—A. Of cement used—23 feet of sand and cement to 100 cubic feet of masonry.

Q. Twenty-three per cent. of sand and cement used per 100 feet of masonry?—A. Yes, sir.

Q. How did you get at that?—A. We would take our bills that we paid.

Q. Were those your only means of knowledge?—A. That was our only means of knowledge; yes, sir.

Q. Is it your only means of knowledge?—A. We have a check for hauling the cement, also.

Q. Have you compared the check for hauling the cement with your purchase bills of the cement, to see how they compared?—A. Yes, sir.

Q. Do you find that it all went there?—A. Yes, sir. We are pretty particular about that.

Q. Was any of the cement condemned?—A. The cement was condemned one time and we were not allowed to use any more and had to change brands. They found on inspection that the cement was not being ground fine enough, and they stopped using a certain brand of cement.

Q. Was any of that cement sent away or was it all used?—A. I think all was used that was allowed to be drawn on the work. When the cement was condemned there was none allowed to be used no more.

Q. What became of that that was on hand and was not used in the work?—A. That was on hand. It was a very small quantity. That was allowed to be used.

Q. Then there was no cement that you know of that you bought for this purpose that was not used, as a fact?—A. There was some small quantity, and sometimes a sack or two would get wet and that would be thrown away.

Q. But otherwise there was none?—A. There was none.

Q. Otherwise all that you bought, good or bad, was used?—A. Oh, no; we didn't have no bad.

Q. Then why did they condemn it?—A. Not because it was bad, but because it didn't come up to the standard.

Q. Not because it was bad, but becase it was not the cement that the contract called for?—A. It was not up to the standard; that was the report to us.

Q. What was the standard?—A. I couldn't tell you that. The engineer in charge of the work could state what tensile strength was required.

Q. Would you not call cement in connection with this contract bad which was not up to the standard?—A. No, sir; it might be medium in quality.

By Mr. McMILLIN:

Q. It violated the contract, did it not?—A. Not as I understand it. They stipulated a certain tensile strength, but there is cement under that that is perfectly good.

Q. It would not answer the contract if it did not come up to that?—A. No; it wouldn't answer the contract.

Q. Then, as Mr. McMillin says, it was bad under the contract?—A. Yes, sir; under the contract.

Q. But it went into the work, as I understand?—A. There was none allowed to go into the work, Senator, that was not accepted; none of it.

Q. Cement that was not up to the standard went into the work, did it not?—A. We received an order from these people that we must change the brand of cement; that we would not be allowed to use any more cement of that kind; and from that we supposed that it was not up to the standard. Why that was I couldn't state under oath; but that information you can get direct from the engineer in charge of the work.

Q. Now, I will try you again. Was there any cement that was brought to the work condemned by the Government officials or inspectors, whoever they may have been?—A. Was there ever any? I

couldn't answer that question, because there might have been a load of cement condemned that was sent back unbeknown to me.

Q. Do you not know of any cement, then, that was condemned?—A. No, sir; I don't.

Q. Did you not receive some communications from the engineer which were very explicit upon that subject?—A. We received some communications from the engineers stating that we must change the brand; that we wouldn't be allowed to use any more of that cement.

Q. But they did not ask you to take away any that you already had?—A. No, sir.

Q. You are sure about that?—A. No; I am not sure. I think that they required us to put in less sand and more cement.

Q. Then I will ask you one more question on the cement: Did all the cement that you bought and had shipped here to Washington for the purposes of this tunnel get into the tunnel, except that now and then a bag or sack would get wet, and which you say would be thrown away?—A. No, sir; not all, when you say all; because we got some cargoes of cement from New York, and when the work stopped we used the cement and sold it elsewhere, although we had bought it for the exclusive use of the tunnel; that was Rosendale cement, but it was never on the line.

Q. That was cement that was on hand when the work stopped?—A. Yes, sir.

Q. Excepting the cement that was on hand when the work stopped, and excepting the cement that was wet, did all that you bought and shipped to Washington go into the tunnel?—A. I think it did.

Q. Do you know whether it did?—A. No; I don't know that.

Q. You are merely speaking from information and belief?—A. Yes, sir; merely from my general belief; that is all.

Q. Where did you buy the sand that was used?—A. We buy it of the men that get it down the river.

Q. It comes up the river in boats?—A. Yes, sir.

Q. Where is it gotten?—A. I couldn't say; it is got down along the river somewhere.

Q. Down along the shores?—A. Yes, sir; on the beaches I suppose; it is all river sand.

Q. Could you give us the total number of pounds—if cement is sold by the pound—that you bought and shipped to Washington?

The WITNESS. Of cement?

The CHAIRMAN. Yes.

The WITNESS. Yes, sir; the book-keeper can give it to you.

The CHAIRMAN. Please get it from the book-keeper and give it to us Monday, or at some time.

Q. Can you tell us the amount of sand that you bought and had delivered at Washington for the purposes of the tunnel?—A. Yes, sir; I think we can; that is my idea.

Q. Will you give us those figures whenever you can find them?—A. Yes, sir.

Q. Was all the sand that you bought to be delivered at Washington used in the tunnel?—A. No, sir; we used some sand for building.

Q. About how much had you bought for tunnel purposes and brought here that was used for other purposes?—A. I would have to make an estimate to get at that. I would have to get at the number of thousand bricks that we used so as to make an estimate of the sand.

The CHAIRMAN. I wish you would get at that and give us the benefit of the information, and then we shall know how much sand and cement came to the tunnel, and we can compute the percentage ourselves.

TESTIMONY OF ARTHUR W. LEROY.

SATURDAY, *December* 1, 1888.

ARTHUR W. LEROY sworn and examined.

By Mr. CLEMENTS:

Q. In what capacity have you been employed by Beckwith & Quackenbush in relation to the tunnel work?—A. As paymaster and superintendent; that is all.

Q. Superintendent of what?—A. I had the superintendency of the Foundry Branch and Rock Creek shafts; that is the section of the tunnel from Rock Creek shaft west.

Q. When did you first begin work with them?

The WITNESS. On this aqueduct extension?

Mr. CLEMENTS. Yes.

The WITNESS. November 23, 1883.

Q. Was that at the time they began work first under the first contract?—A. Yes, sir.

Q. You have been connected with them, then, from the beginning of their work down to this time?—A. Yes, sir; but not all the time. I have been away from here on two occasions; I went away on one occasion on different work.

Q. How long have you been away altogether?—A. About four months.

Q. What was your specific actual duty as superintendent?—A. To look after the excavation and see that the forces were properly arranged.

Q. And to see that they did the work according to the specifications?—A. Yes, sir.

Q. Were you actually present at the work most of the time?—A. During the time that I was superintendent, yes, sir.

Q. What time was that that you were superintendent?—A. That was about the 1st of August, 1886, until February, 1888; and then I was sent to other work on the Erie Canal, and returned in June, 1888, and from June until the present time of suspension.

Q. Was your superintendence confined to a particular work there, do you say?—A. Yes, sir; I had general superintendence of that division, but it was more particularly connected with the excavation—the trimming.

Q. What part of the tunnel?—A. That is, from Rock Creek shaft west to the west connecting shaft.

Q. Did you have any supervision of the packing or lining?—A. No, sir; not directly.

Q. Were you present during the time that the lining and packing were done, or any portion of it?—A. Yes, sir; I was always where some portion of it was being done.

Q. Did you give attention to that also?—A. In a general way I did; yes, sir. As I passed by where they were packing I used to see that they were packing properly at that time.

Q. Do you know anything about this getting off the line or grade in cutting the drift?—A. I know that we were off the line, or I know the lines were changed from the original lines that we had in two instances, or at least in one instance that I know of.

Q. Where was that?—A. That was in Champlain avenue, east heading.

Q. Do you say that there was another one? If so, where was that?—

A. The other was in reference to grade. That was in Champlain avenue west. I know the grade was changed there.

Q. Now take the first one you mentioned, and tell us to what extent you got off the line.—A. I couldn't tell you to what extent, because it wasn't important. I know that we followed the original lines that were given there by Mr. Partridge; I think his name was Partridge. He was at that time engineer.

Q. Employed by the Government?—A. Employed by the Government, yes; and afterwards, when Mr. Coryell succeeded him, or Mr. Coryell was the engineer that gave us lines, he said the lines were wrong, and he changed them; that is, he gave us new points, so that we run on a reversed curve for a short distance.

Q. You did not straighten the work back?—A. No, sir.

Q. Can you give us any idea in general as to how far that curve extended?—A. I can't give you the exact points, no, sir, at that time. At the time that curve was run in there I wasn't acting as superintendent, but I think it was about 200 or 300 feet from the shaft; I am not positive as to that.

Q. Can you tell us about how many feet it varied from the line?—A. No, sir; I can not.

Q. Can you give us an idea of about how many feet of the tunnel, the length of it, you superintended; that is, the excavation?—A. Yes, sir; between 8,000 and 9,000.

Q. Can you tell us about what was the actual size of the excavation of the tunnel—I mean the whole excavation before it was lined?—A. That varied according to the nature of the rock. In some places we could drive the tunnel through very near a normal section, which was 7½ by 11 feet; and other times where we had blocky or seamy ground it would break wider and break outside of the holes.

Q. Could you give anything near an average?—A. No, sir; I could not. It was the duty of our engineers to look after that; it didn't come under my supervision.

Q. Do you remember of instances of bad rock, as you say, where the excavation was much larger than the normal size?—A. Oh, yes, sir; I remember one case particularly in Rock Creek west, which was about station 1,600; I know there it was very large.

Q. About how large?—A. About 18 feet, I should say, and perhaps 16 feet wide.

Q. For about what length did that occur?—A. About 50 feet.

Q. Do you remember any other instance of that sort where it was much larger than the normal size?—A. Yes, sir; I remember in Champlain avenue west of what we call the Crow's Nest; that broke very large.

Q. About how large?—A. I couldn't give, with any accuracy, the size of that; that was in what we call the eastern division; that wasn't under my supervision there, but I know of the circumstances, and was in there and seen it.

Q. For about what length was that place?—A. That was 30 to 40 feet.

Q. Do you consider that that was entirely due to the character of the rock?—A. Yes, sir.

Q. Was it not partly due to too much explosive power?—A. It was due wholly to the character of the rock, I think.

Q. Did you not receive remonstrances from Captain Symons during that time about the use of too high explosives?—A. I don't know that I ever did.

Q. In regard to making the excavation too large in that way, larger than was necessary, did you ever have any notice or anything of that kind?—A. No, sir; I don't think we did; there might have been notices, but I don't think they ever came directly to me.

Q. You do not remember that Mr. Beckwith or Mr. Quackenbush ever communicated to you any complaints of that sort that came from the engineers?

The WITNESS. Breaking the rock too large by too high explosives?

Mr. CLEMENTS. Yes.

The WITNESS. No, sir; I know what our instructions were, to make the excavation as near the section as we could, and not have it too large.

Q. But no remonstrances were made to you by them, or any body representing them, on account of the fact that the excavation was being made too large?—A. My attention was called to it by them, and reasons were asked why it did break too large, and I gave the reason why it broke too large, or why it was larger than the section required.

Q. How were those large excavations that you have spoken of behind the lining filled?—A. The one in Rock Creek west was packed solely with rock and cement, rubble masonry, and the one in Champlain avenue, at the time the excavation was made, and it was timbered, was packed with cord-wood; and then, afterwards, they substituted rock to a certain extent, but I don't know how far.

Q. That one was filled partly with cord-wood, you say?—A. Yes, sir.

Q. Was that left there?—A. I don't know whether any of it was left or part of it.

Q. Did you ever see any neglect or imperfect packing there?—A. Yes, sir. Well, I never seen any before it was done. I have seen packing that was imperfect after it was taken out, after it was said to be imperfect and ordered to be made good.

Q. Was that while you were superintendent?—A. Yes, sir.

Q. How came it to be taken out?—A. It was reported as bad packing and it was ordered by the chief inspector to be repaired.

Q. By whom was it reported?—A. I think by Mr. Briggs, a subinspector.

Q. What was the character of that work that was taken out?—A. There was some cement, but not what the inspector thought was sufficient.

Q. How many cases of that sort do you remember or call to mind now as having been removed?—A. Two.

Q. Give us the extent.—A. One was in Foundry Branch east heading and the other was in Rock Creek west heading. The one in the east head was repaired in a very short time; there was very little of that.

Q. About how much?—A. Well, I should say perhaps 4 or 5 cubic yards.

Q. Was it on the side or overhead?—A. That was overhead.

Q. Now the other place?—A. The other one—at that time I was temporarily absent from the tunnel, and I couldn't say to what extent that was; I know it took a little longer to repair that than it did the one in Foundry Branch.

Q. Was that a filling of the same character—dry stone?—A. I am not positive as to that; I think there was a lack of stone there.

Q. A vacancy?—A. Yes, sir; I think think there was a vacancy. That packing, too, I think, was done in the night. I couldn't say positively as to that, though.

Q. That which was removed was done in the night, you think?—A. Yes, sir; that was in Rock Creek west that I speak of.

Q. By whom was that reported?—A. I couldn't say; I don't know.

Q. Do you know how long after it was done until it was reported as being bad?—A. It was the next day, I think. I know they commenced the next day to repair it.

Q. Under whose immediate supervision was the bad work done, of which you have just spoken?

The WITNESS. On the part of the contractors, do you mean, or inspectors?

Mr. CLEMENTS. The inspectors.

The WITNESS. Mr. O'Brien.

Q. Both cases you have mentioned?—A. No, sir; the one in Foundry Branch was under Masters.

Q. Were O'Brien and Masters Government inspectors?—A. Yes, sir.

Q. What inspectors under the contract did that work?—A. There was no inspectors, without it was the subcontractors; they had foremen there.

Q. Who were they at these particular points?—A. At Foundry Branch Mr. Brennan was in charge most directly; he staid right there in the headings all the while; and at Rock Creek I think it was a man by the name of Martin.

Q. Was Briggs an employé of the Government or of the contractors?—A. He was an emyloyé of the Government.

Q. Who was the man representing the contractors at one of those points? You mentioned just now Brennan himself and one other. Who was the other person?—A. I say I think his name was Martin; he was a foreman under the subcontractors.

Q. Was he continued in their employment after that?—A. Yes, sir.

Q. Do you know whether the workmen that did that bad work were continued or discharged?—A. They were discharged, I think.

Q. Do you know who they were?—A. No, sir; I don't.

Q. You state that you acted in the capacity of paymaster for the contractors?—A. Yes, sir.

Q. How long have you done that?—A. From the commencement of the work, in 1883.

Q. Tell us now what your expense account includes; what kind of expenses you put in that account?—A. That I couldn't tell you; I am not the book-keeper, and I have very little knowledge of the general books.

Q. What were your duties as paymaster?—A. My duties were to make out the pay-roll and pay the men in our employ.

Q. That included all the force—foremen and workmen?—A. Yes, sir; all the force employed in the tunnel or in connection with the tunnel.

Q. Did you make all payments that were made to all the employés of every class in connection with this work?—A. Yes, sir; while I was here, and I was here with the exception of the time I speak of that I was in New York.

Q. Did you, for all the payments that you made, take vouchers and return them to the book-keeper?—A. No, sir. I will correct my other statement that I made first. I had an assistant. At times it was impossible for me to get through the entire length of the tunnel on Saturday, the day that we paid, and I had an assistant, that would take one shaft, perhaps, and pay the men there.

Q. Who was he?—A. He was the time-keeper generally; in fact, all the time.

Q. What was his name?—A. His name was Heitmuller.

Q. What is his first name?—A. Albert.

Q. What is his address?—A. It is 1035 Thirtieth street, Georgetown.

Q. Now to come back to the question I asked you a moment ago: Did you always receive vouchers when you made payments?—A. No, sir; I would make out my pay-roll, and make a requisition on the book-keeper, Mr. Davis, for the amount required to be paid, and Mr. Davis would make a check for that amount and have it cashed at the bank, and it was given to me, and I put it in the pay envelopes.

Q. And received no vouchers?—A. No vouchers; no, sir.

Q. Did you receive vouchers from any persons for money paid out for the firm?—A. No, sir.

Q. Did you pay money to anybody except the workmen at the tunnel at any time?—A. No, sir; with the exception of once that I remember I paid to one of the inspectors for overtime, but I suppose he would have been classed at that time as a workman.

Q. One of whose inspectors?—A. One of the Government inspectors.

Q. Which one?—A. Mr. Lucas, I think it was; I am quite positive it was.

Q. Thomas Lucas?—A. Yes, Thomas Lucas.

Q. And what did you pay him for?—A. It was for overtime; that is, work in excess of the hours required by the Government of him as inspector; at times when we wished to have an inspector stay for an hour or two longer in order to finish up a piece of packing—it was generally packing—they wouldn't allow us to do that without an inspector, and the inspector would refuse to stay without pay for it.

Q. At what rate did you pay him?—A. At the rate of 50 cents an hour.

Q. Did you pay any of the Government inspectors as time-keepers?—A. No, sir; I did not.

Q. Was not O'Brien paid as time-keeper?—A. Not to my knowledge; I heard he was, but not by me.

Q. Do you know who paid him?—A. Not positively; I have heard.

Q. Who have you heard?—A. I heard the subcontractors did.

Q. Who were they?—A. Brennan & Palmer.

Q. To what extent did you pay Lucas for overtime; was that daily?—A. No, sir; that was the only time that I recollect of now; that is, on two occasions; those were while he was employed in Champlain avenue as inspector.

Q. Do you know anything about the payment to Masters for overtime?—A. I don't know that he ever got any.

Q. Was there a good deal of this filling behind the lining done in the night?—A. No, sir; there was some of it, but I don't know to just what extent; I don't know what proportion of it was done in the night.

Q. Do you know anything about the payment of any money to any persons for these contractors, other than the regular pay-roll of workmen that you have mentioned already?—A. No, sir; I don't.

By the CHAIRMAN:

Q. Did Beckwith & Quackenbush, in regard to this business, have what is called an individual ledger?—A. No, sir.

Q. That was no part of their system of book keeping, then?—A. No, sir; they had no individual ledger. They had another ledger which was devoted to property in the North which they own, but nothing connected with this work that I know of.

Q. These ledgers you have now are connected with this work?—A. Yes, sir.

Q. Are they connected with anything else?—A. That I could not say positively.

Q. State so far as your knowledge goes.—A. So far as my knowledge is concerned, they are not. (Correcting himself.) Yes; they are. I think there are things in here about other work.

Q. Do you understand book-keeping?—A. Not thoroughly.

Q. In a general way?—A. In a general way.

Q. Do you know what book-keeping by double entry means?—A. No; I can't say that I do.

Q. Do you know on what system these books are kept that are now here?—A. No, sir; but they are on the double entry system, I should call it.

Mr. PERRY. Here are two individual accounts in this ledger, Clinton Beckwith and John V. Quackenbush.

Q. Is there any individual account, as we call it, with these contractors or any of them?—A. Yes, sir; I think there is.

Q. Just find it.—A. P. F. Brennan.

Q. Turn to page 79 of the journal. That was not a payment on his March roll on the contract, was it?—A. Yes; for a payment on his contract.

Q. That was for paying his men?—A. Yes, sir.

Q. Then I see in the March account "P. P. Brennan" written in pencil, "$20," without stating what it was for.—A. I think that was advanced to Mr. Brennan, for sometimes he asked for money for himself.

Q. Is this the book of original entries?—A. Yes, sir.

Q. Where would the March and April roll be; is that a separate piece of paper, or is it merely your time-book?—A. The time-book.

Q. Now turn to page 84. That is the check-roll; that means time-book?—A. Yes, sir.

Q. Turn to page 83. Brennan's name does not appear there, does it?—A. Yes, sir; there it is [pointing].

Q. That is crediting his reported work done?—A. Yes, sir.

Q. Less 10 per cent. retained? Then it would appear that this individual account of Brennan's contained the moneys that he received on his contract?—A. Yes, sir.

Q. Is there any account for Brennan & Emory?—A. I think there is no account with Brennan & Emory.

Q. Do you think Brennan's account covers all the payments made to Brennan & Emory?—A. I do; yes, sir.

Q. Do you t hink it covers all the payments made to Brennan & Palmer, after Emory went out?—A. No, sir; it does not.

Mr. MCMILLIN. I see, on page 176, that $12 was paid to O'Brien; that refers back to journal page 87, and in the journal I find the same entry.

The CHAIRMAN. What does that appear to have been made for?

Mr. MCMILLIN. It is under the head of masonry in tunnel, and $12 was paid to O'Brien for hauling mortar and brick.

Q. Do you understand that the Thomas O'Brien whose name appears as being employed and paid by Beckwith & Quackenbush was the same Thomas O'Brien who was the inspector for a certain length of time?—A. Yes, sir.

Q. Do you know whether O'Brien was paid anything while he was Government inspector for overtime or for keeping time?—A. Not of my own knowledge; only what I have heard.

Q. What have you heard?—A. I have heard and read in the papers that he was.

Q. Now, look at that book to see where the account of Brennan & Palmer begins; at what time does it begin?—A. It is entered here as P. F. Brennan & Co.; then there is a note "Brennan & Palmer," and it commences in May, 1888.

Q. Does the ledger show a final footing of all the payments made, or are balances struck off from time to time?—A. Balances are struck at different times.

Q. So that without taking time to put them all together you could not tell the total amount that has been paid?—A. No, sir; I couldn't without making the footings.

Q. Can you tell when the last payment was made to Brennan & Palmer?—A. It was in the month of October; October 27.

Q. How much was paid at that time?—A. Six hundred and ninety-four dollars and twelve cents.

Q. Does it show on what account?—A. On account of check-roll.

Q. Is there any account there with Lucas?—A. (After examination.) No, sir.

Q. Do these books show any payments made for time-keeping by any of the Government people?—A. No, sir; I don't think they do.

Q. Do they show any payments made to any of the Government people for overtime?—A. As to that I couldn't tell you. This instance that I know of myself should appear in these books somewhere, I think, but where I don't know. I made a requisition to the book-keeper for the money, but what he did with it I don't know.

Q. It might appear under the head of expense, I suppose?—A. Possibly; I don't know where it does appear.

Q. Did you make that requisition in writing, or by merely telling him you wanted so much money?—A. I made it in writing; it was merely a slip with the amount on.

Q. What did that slip say?—A. It was a recapitulation of the pay-roll, showing the amount required at each heading or shaft.

Q. Was the name of this person Lucas, to whom payment was made for overtime, on the pay-roll?—A. No, sir; I don't think it was.

Q. What had the pay-roll to do with the payment to him, then?—A. I don't know as the pay-roll had anything to do with the payment to him. I understood you to ask if I made any requisition for the money for the pay-roll.

Q. My question was devoted to Lucas.—A. I didn't so understand it.

Q. Did you make any requisition in writing for the money with which to pay Lucas?—A. No, sir; I don't think I did.

Q. How did you get it?—A. By merely asking the book-keeper for the amount.

Q. And he gave it to you?—A. I don't know whether he gave me the money or whether he gave me a check, but I think he gave me the money.

Q. Was any entry made in the books of that payment?—A. Not that I know of; no, sir. I say it may be in the books, but I don't know where to find it.

Q. Did you take any receipt from Lucas?—A. No, sir; the time, I think, was reported by Mr. Emory, as to the amount of overtime that he had worked.

Q. How did you get vouchers from the regular forces when you paid them?—A. It was impossible to get vouchers. I didn't do it. I used to pay underground. On account of the water, and mud, and smoke, I didn't take any books in the tunnel, and didn't receive any vouchers from the men.

Q. How did you carry down the money?—A. I carried it down in envelopes.

Q. Addressed to each man?—A. Addressed to each man.

Q. The envelope containing the money that each man was entitled to?—A. Yes, sir.

Q. And you handed him the envelope?—A. Yes, sir.

Q. And that ended the transaction?—A. That ended the transaction.

Q. So that if you had wanted to carry down $100 to Lucas, or me, or anybody else, could you have done it in the same way?—A. I suppose I could.

Q. And could have handed him or me the envelope, and that would have ended the transaction?—A. Yes, sir.

By Mr. PERRY:

Q. Do you know whether or not the Thomas O'Brien who appears from the ledger there to have been paid $12 in July, 1887, for hauling sand or brick, is the same Thomas O'Brien who was inspector afterwards?—A. Yes, sir; I know it is the same man.

By the CHAIRMAN:

Q. Is any entry made anywhere for regular time-keepers?

The WITNESS. Who appeared on the general pay-roll?

The CHAIRMAN. You say Lucas was paid on the pay-roll as time-keeper?

The WITNESS. No, sir; I understood you to ask if there was an entry made for his services as time keeper. The time-keepers were entered on the pay-roll every week as time-keepers.

Q. But Lucas was not?—A. No, sir.

Q. How does it appear in regard to the Government inspectors when they were paid for keeping time?—A. I say if they were paid they were paid by the subcontractors, not by me.

Q. That does not appear on the books?—A. No, sir.

Q. And you did not pay them yourself, if they were paid?—A. No, sir; with the exception of Lucas; as I state, that one time.

Q. How came Lucas to be an exception?—A. At that time I don't know that there was any other inspector working overtime; I don't think there was.

Q. And that is your explanation?—A. Yes, sir.

Q. Is there an individual account in the book with Mr. Clark?—A. Yes, sir; there is.

Q. Please open to that?—A. Seven dollars and forty-five cents is all the individual account he had, and that was for blasting materials that he purchased while in the city, and afterwards presented a bill to the book-keeper and received credit, and was afterwards charged with the check that was given.

Q. The other payments to him appear under some general head, either as salaries or expenses, then?—A. Salaries.

Q. If he had any other incidental expenses to pay, how would he get the money to pay them?—A. In the same manner he did this, I suppose; by presenting a bill to the firm for those incidental expenses, whatever they might have been.

Q. Were incidental expenses paid on vouchers?—A. I think they were, with a few exceptions. I could name an instance where I know that they were not.

Q. You can name that if you wish it.—A. I think at one time we had a horse, from one of the teams, that was taken by Mr. Key, the agent

of the Society for the Prevention of Cruelty to Animals, and I left $5 for collateral, and reported that to Mr. Davis, and he gave me $5 without any voucher.

Q. That is all you know of?—A. That is all that I can call to mind at present.

TESTIMONY OF FRANK W. CLARK.

SATURDAY, *December* 1, 1888.

FRANK W. CLARK, sworn and examined.

By the CHAIRMAN:

Q. What is your age?—A. Forty-two.

Q. And your occupation?—A. Civil engineer.

Q. How long have you been civil engineer?—A. About fifteen years.

Q. Have you been employed by Beckwith & Quackenbush, contractors, in relation to the aqueduct tunnel here?—A. Yes, sir.

Q. When did your employment begin?—A. October 18, 1886.

Q. Had you been employed by them before?—A. No, sir.

Q. And you have continued in their employment since?—A. Yes.

Q. Have you ever received any money from them, other than your salary?—A. No, sir.

Q. You have paid no incidental expenses?—A. No, sir.

Q. What was your salary per month?—A. One hundred dollars.

Q. I understand you to mean, then, that you have had no pecuniary transactions with them, either receiving or disbursing money for them, except the mere matter of your salary?—A. That is all.

Q. What were your duties as engineer?—A. I was to give grades and centers in the tunnel, take cross-sections, and make an estimate every month.

Q. Any other duties?—A. I measured sand for them; I believe that was in relation to the tunnel.

Q. Measured the sand delivered by the furnishers of the sand, or the sand as it was put into the mortar to make cement?—A. By the furnishers of the sand.

Q. Did you keep a record of the amount of sand delivered?—A. Well, I had the books with all the measurements taken; I don't know that I measured all the sand; I have a record of all that I measured.

Q. Did you have anything to do with making the cement?—A. No, sir.

Q. Who did that?—A. I don't know.

Q. Did you have any duties in respect to seeing as to the proper progress of the work?—A. I don't know as I understand your question.

Q. Did you have any duties under Beckwith & Quackenbush in relation to seeing to the proper execution of the work?—A. My instructions were to see that the work was done properly, and in accordance with the specifications, as I passed through the tunnel.

Q. That is, when you were there for the purposes of pure engineering?—A. Yes, sir.

Q. But not otherwise?—A. Not otherwise.

Q. How often did you go there for the purpose of engineering?—A. I think that I would average at least four days in a week.

Q. How long a time, on an average, on each day would you be in the tunnel, in the neighborhood where the work was going on?—A. Well, usually from three to five hours; that is, in all the different shafts.

Q. It was not holed through when you began?—A. No, sir; it was all holed with the exception of Champlain avenue east and Howard University.

Q. Making a total unholed of about how much?—A. In the neighborhood of 2,000 feet.

Q. Going there, then, four days in the week on an average, as you think, and spending from three to five hours a day there, did you discover at any time any imperfection in the progress of the work?—A. No, sir.

Q. Did you look to see if you could discover any?—A. Yes, sir. I usually, in passing through the work, would have an instrument with me, and would pass through and look at the side walls as I passed through the work. It was very bad getting through, especially with an instrument, and I would go right through into the headings and do my work, and get out again, and go to some other heading. I always noticed the work on the sides, and it was good work, and I supposed it was all good. I very seldom got up on the scaffold. The side walls were of rubble masonry, and the most of it was brick masonry until this past year.

Q. Did you notice on these occasions as a usual course, or try to notice particularly, the character of the backing?—A. Yes, sir.

Q. And it always appeared to be good?—A. Yes, sir.

Q. How high did those side walls that you thus observed rise above the floor of the tunnel?—A. Some 4 and some 5 feet.

Q. Was work going on at those side walls at the time?—A. Yes, sir.

Q. And you discovered nothing at all defective?—A. No, sir.

Q. Did you see the superintendent of Messrs. Beckwith & Quackenbush on those occasions generally?—A. I would most always see one or the other, yes, sir; either in the shaft or on top of the work.

Q. In the place where the work was going on?—A. Well, not always. I would meet them in different parts of the tunnel, sometimes going in, and sometimes going out, and on top.

Q. Did you often see them in the place where the work was going on?—A. Yes, sir; quite often.

Q. They appeared to be in the places where they would have an opportunity to observe bad work if it was being done?—A. Yes, sir.

Q. Did either of them ever report to you or mention to you in any way that they had discovered or knew of any bad work?—A. No, sir.

Q. Did you see the Government inspectors about there?—A. Yes, sir.

Q. What did they appear to be doing?—A. They seemed to be attending to their duties. I would often see them on the scaffold, standing with the men, very often.

Q. Did any one of those people ever mention to you any bad work or deficiency?—A. I have no recollection of it.

Q. When did you first hear or in any way suspect any bad work?—A. I don't know as I could tell. I remember the time that Lieutenant Townsend wrote a letter in reference to some bad work this past summer; I don't remember the date.

Q. Was that the first occasion you had heard of or suspected of any bad work?—A. I wouldn't be sure about that.

Q. Try to recollect and see if you can remember whether you ever heard of or suspected any bad work before this occasion when Lieutenant Townsend wrote about it.—A. My recollection is that there was some bad work reported before that, but I am not positive about that; it was not reported to me.

Q. Reported by whom?—A. That I couldn't state.

Q. Can you remember where it was?—A. No, sir; I have a recollection or impression that there was bad work reported before this in some part of the tunnel, but I don't remember where it was.

Q. Do you mean reported by rumor, or reported as a matter of business to somebody who had something to do about it?—A. As a matter of business to some one who had authority.

Q. You can not remember whether that bad work was reported by Beckwith & Quackenbush, or the Government inspectors, or by whom?—A. I don't remember.

Q. And you do not remember where it was and what it was?—A. I think it was in reference to the packing, but I don't remember what shaft it was.

Q. When you heard of that, you being the engineer in charge, do you remember doing anything about it, going to see it, or whatever?—A. No, sir; I don't think I did. I didn't, down to the time that Lieutenant Townsend reported, because the work was repaired before I was in the tunnel again. My duties kept me very closely all the time.

Q. When did you first get the impression, if you have any impression now, that there was considerable bad work there?—A. I had no such impression until the investigation began or until these letters were published from the Kendall Brothers, their affidavits.

Q. Although for about a year you have been in there about four times a week?—A. Yes, sir.

Q. You made the cross-sections and measurements upon which the contractors were paid after you came?—A. No, sir.

Q. Did you make cross-sections and measurements, or did you depend upon the cross-sections and measurements of the Government engineers?—A. I made them.

Q. Have you those here?—A. Yes, sir; I believe they are in the office here.

Q. Do you mean your office up at Georgetown?—A. I believe they are here in the committee-room; I brought the books here yesterday.

Q. Where did you leave them?—A. (Producing books.) These are the books.

Q. Take a book where you have a recapitulation or summary.—A. There is no recapitulation or summary; I have the different sections and quantities.

Q. Take the earliest book in point of time when you began.—A. This book was kept by the other engineers. The work was done at first by day's work, 25 to 50 or 100 feet in a place.

Q. This book contains, then, the cross-sections and measurements of your predecessor under Beckwith & Quackenbush?—A. Yes, sir.

Q. Get the earliest date of that.—A. I think that was the first cross-section put in by myself. [Pointing.]

Q. What date is that?—A. That is October 23, 1886.

Q. You were in the tunnel two years?—A. Yes, sir.

Q. What is the earliest date for your predecessors under Beckwith & Quackenbush?—A. I don't know as I can tell.

Q. Does it not begin with the beginning of the book?—A. No, sir; it does not. Mr. Porter was the engineer, and he commences at 1685.

Q. Howard University?—A. Yes, sir.

Q. East or west?—A. There is only one head from there.

Q. What is there in that book before you?—A. Here was a piece that was left out when the tunnel was lined at first; that is, with dry pack-

ing; and from 1193, I think it was, to 1475 was a piece that was skipped and was put in afterwards.

Q. Turn to the first page of that book, and let us see who began it. There is nothing on page 1, but on page 2; whose figures are those?—A. Those are mine.

Q. Has this book anything in it that is not yours?—A. Yes, sir; this is Mr. Porter's work [pointing], and this is Mr. Porter's commencing from 1685.

Q. Commencing on page 71?—A. Page 71.

Q. And running how far?—A. To page 89.

Q. Inclusive?—A. Yes, sir.

Q. Do you know why Porter began in the middle of the book to keep it?—A. I do not, unless it was the fact that he was in the middle of the shaft, and he thought of working both ways. That may seem very funny, but if he was commencing in the middle and going both ways in the brick-work he could keep his notes continuously in that way.

Q. I do not quite understand that; it may be right.—A. I think it is right. Under the first orders the tunnel was to be bricked in many different places, some places no more than 25 feet; and for that reason the notes are mixed up in the book in a great measure.

Q. You say that you are not able now to state the totals of your measurements and cross-sections, as a check on the engineer's measurements and cross-sections for payments to Beckwith & Quackenbush?—A. I could state approximately.

Q. Well, state approximately?—A. I could not, either. I could state from October, 1886, until the work shut down in the first of October, 1887, what the quantities were; that is, very closely. The Government cross-sections were about 17,600, and my cross-sections were about 17,900, approximately.

Q. Cross-sections of what?—A. Of the amount of packing and concrete used.

Q. How did you make your cross-section measurements?—A. By using a plane table with radial lines, and measuring from center to center of the tunnel every time, and measuring the angles.

Q. And that, I suppose, was before the packing was put in?—A. Yes, sir.

Q. And in making these measurements for the packing did you leave any unmeasured spaces exterior to where the masonry work of lining properly would be?—A. I don't think that I did, unless it might occasionally be where there was timbering in the roof.

Q. Do you remember any such instance?—A. I remember places where there was timbering; yes, sir.

Q. Do you remember any instance in which you failed to take a cross-section and make a computation of the cubic quantity of the whole space to the wall of the rock?—A. Well, not unless it was such a case as I just spoke of, where it was possible that I couldn't see above the timber what the packing was.

Q. You intended to cross-section and complete the whole area unoccupied or that would be unoccupied behind the brick and side-wall masonry, did you?—A. Yes, sir; wherever packing would go.

Q. Having so made your computations, you say, down to the time when the work was suspended in October, 1887, the total difference between yours and the Government engineer's computation was how many cubic yards?—A. I think about 300.

Q. In a total of about how many cubic yards?—A. Between 17,500 and 18,000.

Q. Work was resumed in the spring of 1888, I suppose?—A. Yes, sir.

Q. From then down to the time it was suspended did you take cross-sections and make measurements and computations for the same purpose?—A. Yes, sir.

Q. How did you do those?—A. By the same process.

Q. You measured by those processes and computed the cubic contents to be paid for, of the spaces between where the masonry work of the side walls and the brick arches should be and the wall of the rock?—A. Yes, sir.

Q. On both sides and at the top?—A. Yes, sir.

Q. Do you know how much your totals of those measurements varied from the measurements of the Government?—A. No, sir; I do not.

Q. You never made any comparison?—A. I have not made any comparison.

Q. Down to the time when payments stopped, and as long as payments were made for this work, do you know whether there was any difference between your result in measurement and those of the Government engineers?—A. I know that there was a difference; yes, sir.

Q. How much?—A. But how much I don't know.

Q. Was it great or small?—A. I don't know that I can swear to that. The Government did not furnish us with their estimates under the last contract.

Q. By that word "estimate" what do you mean?—A. I mean that they did not furnish us with the quantities of packing.

Q. Which they computed were to go in or had gone in?—A. Yes, sir.

Q. How much were your totals for the work that was done in the spring of 1888 down to the end of the work?—A. That I don't know.

Q. Are you able to find out from the book?—A. Yes, sir.

Q. Could you do it presently, or would it take some time?—A. It would take some time. I would have to make some computations.

The CHAIRMAN. I wish you would do that and send it to us in a note, if we do not have to call you again, to save the trouble of your coming here.

The WITNESS. I will do so.

Q. Have you ever made any computation of the proportion of vacant space existing behind the line of the lining proper and between it and the rock at the sides and above, as to the amount of mason-work in the tunnel?

The WITNESS. The amount of packing?

The CHAIRMAN. Yes; the amount of packing in proportion to the amount of regular masonry.

The WITNESS. Well, no, sir; I never made any such comparison. I don't know that I ever did. I have no recollection of it.

Q. What do you think would be the average distance from the crown or key of the arch, through the whole 20,000 feet of the tunnel, to the surface of the rock perpendicularly above it?—A. It would be only a guess.

Q. Though your cross-sections embraced every part of that?—A. Yes, sir.

Q. How close together were your cross-sections taken?—A. Most of them were taken, I think, about 6 feet apart; some further than that; some 10, 12, and 8 feet, and some as close as 3 or 4 feet.

Q. Depending, I suppose, on the uniformity of the surfaces you had to measure?—A. Yes, sir.

Q. How high was the highest place after you came there, in your judgment, if you do not remember precisely, above where the key of the brick arch would come to the top of the roof of the rock excavation?—A. I should think 10 feet.

Q. And for how long a distance would you think of any one place where the highest place would be 10 feet?—A. It would be a very short distance; maybe 10 or 15 feet. There was one place about 150 feet, I should think, that would be 5 to 8 feet high.

Q. Were you there when the timbering and cord-wood were put in, at one place that has been mentioned in the testimony, to keep the overhanging rock from falling?—A. No, sir.

Q. That had been done before you went there?—A. Yes, sir.

Q. Have you ever heard of it?—A. Yes, sir; it was bricked over the arch before I came in.

Q. So that your cross-sections did not embrace any of the dry-packing work that had been done at all, did it?—A. No, sir.

Q. About how much of that lining and dry packing had been done when you came?—A. All the dry packing had been done.

Q. But I mean in distance?—A. I think between 1,700 and 1,800 feet is my recollection.

Q. How much of the lining now remains to be done?—A. About 6,000 feet.

Q. How many different places is that?—A. Six.

Q. What is the nature of the rock, as it now appears in these places, still unlined?—A. It varies a good deal; it is very good rock, most of it.

Q. Then what is the use of lining it, if it is very good rock, as you call it?—A. I don't know as that would be for me to say. I presume it is better with lining than without.

Q. You are a civil engineer?—A. Yes, sir.

Q. You had had experience before you came on this work?—A. Yes, sir.

Q. Are you not willing, then, to give an opinion as to the usefulness or otherwise, of lining these places which are still unlined, and most of which you have said were good rock?—A. I said very good rock; I think it would be better lined than unlined.

Q. For what reason?—A. It would be safer. Most of the rock is broken or seamy, and it might fall, although the probability would be that it would not; for that reason, in a work of this kind, the question of safety should be at all times considered, it would seem to me.

Q. What do you think about this broken and seamy region, in respect of holding the water under the pressure that would exist there, without a lining?—A. I believe that would hold the water, although it might not. The water would have a tendency to loosen the rock, of course.

Q. Have you yourself observed whether the rock, since you have been there, has appeared anywhere, on being exposed to the air and moisture, to decompose?—A. I have, I think, in a few cases, yes; I have seen cases where the rock has fallen from the roof when the work was shut down and at other times.

The CHAIRMAN. I wish you would also give us, if you can, as you are not able to do so now, the totals of all the cubic contents of the cross-sections you have made since you came there, as it regards, first,

the lining proper, and, second, as it regards the packing, so that we can see when brought altogether how much you differed from the Government engineers.

Q. You computed the area of the brick-mason work and side-wall mason-work, as well as the area for the packing, did you not?—A. Yes, sir.

Q. How long did it take you to do that?—A. Well, I don't know; not very long; I presume two or three days if I had nothing else to do.

The CHAIRMAN. If you could bring it or send it up here to us we should be glad.

The WITNESS. My computations of the brick-work would be just the same as those of the Government. I have looked their work over, and I have no question about their computations of the brick-work, so far as the area was concerned.

Q. After you came there in October, 1886, was there any divergence in the work from the line and grade required by the plans and drawings of the engineers?—A. I think not. I was furnished with the starting points in the tunnel for centers and grade, and there was nothing said about any changes at all. I knew that there had been changes in the lining, but those were near the shaft.

Q. Were you not furnished with something else than starting points? Were you not furnished with data showing how the line would proceed from those starting points?—A. I was given two points to start from.

Q. That was as to direction; then as to the grade, the grade changed, did it not, or the plan?—A. Yes, sir.

Q. There were three or four or five depressions intended to exist, were there not?—A. Not in the work I had charge of; that is, not the incompleted work.

Q. So that the work that had been done when you came there was to proceed in one direction and with one grade?—A. Yes, sir; I think the grade was not changed; I am positive it was not.

Q. Had you ever been engaged in any tunnel work before?—A. Yes, sir.

Q. That was lined?—A. Yes, sir.

Q. And packed?—A. Yes, sir; I presume it was packed. I know it was packed.

Q. You were aware then, I suppose, when you were working in the course of your engineering business, that it was a critical and important thing that not only the masonry but the packing should be complete according to the specifications; that there should not be any vacant spaces left?—A. Yes, sir.

Q. What do you understand the fact now turns out to be in general? Do you understand that there is a great deal of defective work, or only occasionally a little piece?—A. I only get the most of it from hearsay; I am not allowed to go in the tunnel with the experts.

Q. Supposing, then, for the purpose of getting your idea, that it turns out that in the whole length of this lining that was done after you came there there are quite general failures of good packing and frequent and extensive instances of no packing at all, how can you account for such things happening to have escaped your observation and that of Beckwith & Quackenbush's superintendent and that of the Government engineers and inspectors?—A. Well, as I stated before, when I have been in the tunnel usually I would not stay there over an hour in any one place; I would pass through the brick work and go ahead where the surface had been cleaned, and take my cross-section, which would usually take from half an hour to an hour and a half, depending on the nature

of the ground; and then I would take my implements and go over the ground to some other shaft, not staying there, as my time was occupied in making calculations, and they kept me busy, even in evenings, most of the time, until 9 or 10 o'clock, so that I had very little time in the tunnel; that is, I was kept as busy as a person could be, and I gave but very little attention to the masonry. I would see the inspectors on the work and I presumed that they were doing their duty.

Q. You also saw the superintendents, as you have stated?—A. I used to see the superintendents.

Q. And, taking it altogether, you took it for granted that there was watchfulness to see that the thing was done right?—A. Yes, sir; I didn't feel that it was one of my duties—I don't mean that it was not one of my duties—but I did not have time to inspect the work as an inspector or as a superintendent would.

TESTIMONY OF ELMER E. IMALY.

TUESDAY, *December* 4, 1888.

ELMER E. IMALY, sworn and examined:

By the CHAIRMAN:

Q. What is your age?—A. Twenty-eight.

Q. What is your occupation?—A. Brick-layer by trade.

Q. Where do you live?—A. Twenty-eighth and M street, West Washington.

Q. How long have you been a bricklayer?—A. Since 1882.

Q. Were you brought up to that trade?—A. Yes, sir; I served four years at that trade.

Q. Were you employed by anybody on the Washington Aqueduct tunnel at any time?—A. I was employed by Quackenbush in the first work in the Howard University shaft. I done the first brick-work there that was done. I drove two shafts; one at the west end and one at the Howard University.

Q. Brick shafts—brick lining?—A. Yes, sir.

Q. How long were you engaged on that mason work in the shaft?—A. I went there when it was first started, the first brick-work that was done.

Q. That was in the year, 1884?—A. Yes, sir. I left work on the Pension Office to go there; I was working at the Pension Office at that time. A great many times work would shut down, and then I worked at the State Department afterwards. Then Brennan & Emery took their contract about the time the Howard University shaft was completed, and after they got their contract I was foreman for them in the tunnel underground.

Q. Were you foreman in building shafts?—A. No, sir. Well, they didn't have any foreman; there were only two brick-layers, and were both considered mechanics.

Q. But under Brennan & Emery you were foreman?—A. Yes, sir.

Q. At what shafts or headings?—A. The west shaft.

Q. The heading, then, was from the west shaft?—A. Yes, sir; what is called Foundry Branch, running from west shaft to Foundry Branch. They put in several different sections there.

Q. About what time did you begin on that work?—A. I didn't work any this year at all; this last year's work.

Q. No; I mean when you first began there at the west end, Foundry Branch region; what year was that?—A. About two years ago; I don't know exactly; I never kept any exact account of the time.

Q. I see here, by their time-book, that your name appeared for the week ending March 6, 1885, at Howard University.—A. That was when we completed the shaft.

Q. That was on the shaft work?—A. Yes, sir; I worked on some underground work too, a short while there. The reason I quit at Howard University was on account of Haley; he was working for Quackenbush; I was their foreman at Howard University, and after we completed the shaft I quit on account of this Haley, who was working for Quackenbush. I had a man gauging there, and Haley wanted to run the gauging too, and I let him run it all, and so I quit. That is the only place I ever saw the specifications. Haley did not want the cement mixed according to the specifications. Chadwell was inspector then and Haley discharged the man, and I quit. After I quit Brennan got me to go to the west shaft.

By Mr. FAULKNER:

Q. You say you did that because he did not want the cement mixed according to the specifications?—A. Yes, sir.

Q. He wanted to adulterate it?—A. Yes, sir; he wanted to put more sand in than ought to be in.

By the CHAIRMAN:

Q. What Chadwell is that?—A. He is a watchman at the bridge here in Georgetown—the Washington Aqueduct Bridge, that crosses the creek there.

Q. In whose employ was he at that time—Quackenbush's?—A. No; Chadwell was the Government inspector.

Q. When you left Howard University shaft for that reason, do you know what time of the year it was?—A. No, sir, I don't know; when I quit there I went to work at the State Department; and then Brennan, he got me to quit and take the west-end shaft again. I don't know what time of the year that was exactly, but I think it was in June.

Q. That must have been in June, 1886, for I see your name appears in the books here all along in 1885. You think it was in June?—A. It was June at the time I left there and went to work.

Q. By this time-book I see you were at the Howard University for the week ending May 22, and on May 29 you were not there.—A. That is about the time I left there.

Q. So you left about the last of May, 1885?—A. Yes, sir.

Q. What kind of work was being done there under Chadwell, the Government inspector?—A. Dry stone packing was done then; that was under the specifications.

Q. During the time that you worked at Howard University, down to the end of May, how far had you gone—I mean in length of the mason work?—A. Several thousand feet; I don't know exactly what amount.

Q. Were you the mason in charge?—A. Yes, sir; I was foreman.

Q. You were the foreman of the whole of that work?—A. Yes, sir.

Q. Was Chadwell the only Government inspector at that shaft during that time?—A. During the time I was there, yes, sir.

Q. How large was the largest cavity that was left above the mason work before any filling was put in; how big a hole had to be filled up with dry packing?—A. At Howard University, where we started, there was a pretty large place there. We had large timbers in there, and it was a pretty bad place. I believe it was the worst piece of ground we

had on the line. It was about under Howard University building. There were some places behind the wall I suppose 6 to 8 feet wide.

Q. Behind the side walls?—A. Yes, sir. Sometimes there would be tremendous large places. They would have to put men over in there to pass the stone in there. They couldn't build a bench-wall more than three or four courses, because they had to have something to build it against, and there wasn't anything there to build it against.

Q. How was it on top of the lining? How much space was there above the brick arch?—A. Some places it would reach from 2 to 12 feet.

Q. What became of those timbers in Howard University heading when you put in dry packing?

The WITNESS. That is, over the arch?

The CHAIRMAN. Yes.

A. A great many of them were taken out, but a great many of them were left in.

Q. Why did you leave any in?—A. They said we couldn't take them out; it was too dangerous.

Q. That is, it would not be safe for the workmen, you mean?—A. Yes, sir; if we took them down it would all tumble down. Chadwell wanted to take the timbers all out, but he couldn't get them all out. He started to take some down, but he found it wouldn't do to take them all out.

By Mr. DAWES:

Q. The rock was in solidly?—A. No, sir; it was all loose, and cord-wood and everything was packed up there to keep it up, to keep the fine stone from falling.

By the CHAIRMAN:

Q. While you were foreman of that Howard University shaft did you know of any places not being filled with packing?—A. No, sir; not at that time; I didn't know about there not being any packing. I thought it was all done as well as I could account for. I couldn't keep the run of the packing, pretty much on account of the way we were working at the brick-work; we could not work at this end and then leave that to be backed upand go to the other end. We would have to work from one side to the other. But the inspector was most always there.

Q. How far would your two places of doing brick-work be from each other?—A. Sometimes they would be 200 or 300, or even 400 or 500 feet.

Q. That is, you would project the mason-work a certain number of feet, then leave the packers to fill in above and around; and then, in order not to be idle, you would go to the other end of the work and begin laying the mason-work there?—A. Yes, sir.

Q. So you could not yourself see how the packers did their work when you were not on the spot?—A. No, not all the time. When I was not there the inspector was there and the work was done at that time pretty well; but towards the last they got to hurrying and pushing and shoving us, and the work was poor. That was when this Palmer got in his time. I wouldn't go to work under him, because I had worked under him before, and I thought he was the man who ought to know what brick-work was, but didn't know what a day's work was, and I wouldn't work under him.

Q. Who was the superintendent of Beckwith & Quackenbush when you were building this mason-work at Howard University? Did they have somebody in general charge?—A. Emery & Brennan were the contractors; I was working for them; I was foremen for them.

Q. They were the subcontractors, you mean?—A. Yes, sir.

Q. Who oversaw you and your work as it progressed?—A. Emery and Brennan both.

Q. They themselves oversaw it?—A. Yes, sir.

Q. They were both there?—A. Yes, sir, sometimes they would come there every day, and sometimes we wouldn't see them for two or three days. They generally used the telephone when they wanted anything or anything was needed, and they would be telephoned to come over. Sometimes they would come through there, and sometimes Mr. Quackenbush would be there.

Q. About the end of May, 1885, you left the work on account of some difficulty with Caldwell, the Government inspector?—A. No; on account of Haley; that was Quackenbush's man; he was what was called walking boss.

Q. Do you know his first name?—A. Patrick.

Q. Do you know where he is now?—A. He is working for Quackenbush now.

Q. Haley was the walking boss, as he was called, for Beckwith & Quackenbush?—A. Yes, sir.

Q. This was while Emery & Brennan had the subcontract, was it not?—A. Yes, sir.

Q. Tell us exactly what Haley wanted you to do?—A. I had a man on top by the name of Davis, who was gauging the cement and sand and loading it on cars that brought the sand and cement down in the shaft. A mechanic can tell when the stuff is not mixed right, and Mr. Chadwell would call my attention to it sometimes that it wasn't mixed right, when I hadn't noticed it. I went to the man and spoke to him about it who was mixing that, but the man did not seem to want to say anything or to have any trouble about it. I finally said to the man, "If you can't mix that stuff right I will have to get somebody else to mix it." So then he told me what the trouble was, that Haley had told him to put more sand in it when he mixed it. I then went and saw Haley about it and asked him about it, and he denied it, and said to tell this man to go off the work, and the man was discharged, and I quit because I knew the man was telling the truth.

Q. Did you find some bad mortar; that is, mortar not mixed according to the specifications?—A. Yes, sir; when I found it that way I would judge that the box which they kept the cement in was that way, and I would send down and get extra cement, pure cement, on the car, and bring that down.

Q. When it needed more cement?—A. I would send and get some more cement. If I thought there was more sand in it than there ought to be I would not use it; that was just the amount of it; it couldn't be used. You couldn't hold it on your trowel; it would run off like water, the sand was so sharp. Then if we made good work we would have to point up where they had left bee-holes, as we called them, in the brick-work. We were not putting in cement at that time in the stone-work at all.

Q. You went from there and went to work at the State Department?—A. Yes, sir.

Q. When did you come back on the tunnel work?—A. The next appropriation I went to work for Brennan at the west shaft. He wanted me to go to work right away, but I wouldn't go then.

Q. Was it the same year that you came back?—A. No, sir; it was, I think, the next appropriation. I think I worked at the State Department from June until Christmas, or a little after Christmas.

Q. And you went to work at that place?—A. I went to work at

Foundry Branch, or west shaft, whichever you might call it; I guess it is called the west connecting shaft.

Q. You went to work at Foundry Branch, did you?—A. Yes, sir; they were working from the west shaft towards Foundry Branch; we used to go in and out at Foundry Branch.

By Mr. DAWES:

Q. What made you think that the man who mixed the cement was telling the truth and that Haley was telling a wrong story about it?—A. It looked this way: that the man would mix it right at times and at other times it would be wrong, and it looked like as if he would mix it right once he could do it all the time.

Q. What did Haley say about the bad mixing?—A. It wasn't only this one man he would be after, but this was the one that we could depend upon.

Q. Might not the man have been careless about it?—A. No, sir; for I had made a box, and it would be impossible for him to be careless, because the box only held one of cement to two of sand, and you couldn't go astray.

By Mr. FAULKNER:

Q. Were you foreman at that time?—A. Mr. Palmer was foreman when I went there for a short while.

By Mr. DAWES:

Q. Did you tell Chadwell his story?—A. Yes, sir; Mr. Coryell was over him at the time.

By the CHAIRMAN:

Q. Did you work there this last summer at all?—A. No, sir.

Q. You had worked at the west connecting shaft in completing the shaft before, had you not?—A. Yes, sir; after we had finished that whole shaft.

Q. According to this time-book, about the 10th of June, 1887, you went to work at the west connecting shaft; that was the first time that your name appears here.—A. I went to work there about Thanksgiving Day.

Q. That must have been Thanksgiving Day in 1886, then. Was there any other man with a name like yours? It is spelled here Imaly.—A. That is my name; it is spelled every way.

Q. But you say you went to work about Thanksgiving Day, there?—A. Yes, sir; I know it was somewhere about Thanksgiving; I know there was snow on the ground, and there isn't much snow on the ground in June.

Q. You left the work in May, 1885, according to this book, while the dry packing was going on?—A. Yes, sir.

Q. How long did you work at the State Department?—A. I went to work in June, and worked until work closed down there, shortly after Christmas, cold weather.

Q. In round numbers, that would be the 1st of January, 1886?—A. Yes, sir; the next brick-work that was done there was at the west connecting shaft.

Q. When they closed down at the State Department what did you do until the next summer?—A. I worked for Zephaniah Jones, on this Safe Deposit Bank up here.

Q. You worked all through that season around in private employment?—A. Yes, sir; I went to work for Brennan about that time.

Q. That work commenced in the fall, about Thanksgiving?—A. Yes.

Q. That would be the fall of 1886. When you quit at the Howard University did you go right to work at the State Department that summer?—A. Yes, sir.

Q. When you went to work the second time on this tunnel, after you had worked one season on the Safe Deposit Building are you sure that you began at the west shaft?—A. Yes, sir; I wouldn't work at Howard.

Q. That is clear up by the reservoir, is it not?—A. Yes, sir.

Q. And you think you began about Thanksgiving time?—A. Yes, sir; I know there was snow on the ground, and it was before June.

Q. How far had the tunnel proper progressed from the Foundry Branch shaft when you went there from the west branch?—A. There were three centers put in there at the first start, and one was in there at the time they sunk the shaft. There were about four centers in there when I went to work.

Q. That was five, then?—A. Yes, sir.

Q. How long did you work in there?—A. I worked there until the time it was shut down this last year.

Q. They ended the work in that drift?—A. Yes, sir. We run a certain number and stopped there, and went down several hundred feet below and started another place. I went down there myself when it began; and we used to work at that like at Howard University—one at each end—part at one end and part at the other.

Q. What kind of lining did you put in in the west shaft?—A. When we first went there in that time we were putting in brick all the way around, like we were at the first start. Then we went to put brick on the bench-walls and 13 inches over the center.

Q. What kind of packing was being put in at that time, dry or wet?—A. Wet packing.

Q. Rubble masonry?—A. Yes, sir; cement and stuff.

Q. Were you foreman there?—A. Yes, sir.

Q. How many masons did you have under you?

The WITNESS. Brick masons?

The CHAIRMAN. Yes.

A. Three besides myself.

Q. What sort of packers did you have?—A. I had a man by the name of Davis, and another named Dennison.

Q. Were they masons?—A. No, sir; they were not stone-masons; they were what you might call handy men that I picked up. Davis had worked on the canal and such work as that all that time, around locks, and one place and another; he was a good man. They didn't employ masons, but men that would suit the business to the best of their knowledge.

Q. What kind of knowledge was required for that purpose?—A. To pack solid and tight was all. I never saw any specifications of any of the lining after they had made any change, only the Howard University.

Q. What instructions did you receive as foreman of masons at the west shaft when you went there?—A. I got word from Brennan; when he told me to go to work, he told me to take charge and run it to the best of my knowledge, to run it just to suit my own—not under instructions, but just what I knew myself.

Q. Did he tell you what to do in regard to the packing?—A. No; the inspector told us how.

Q. Who was the inspector?—A. Lannigan.

Q. What did the inspector tell you to do?—A. He said it had to be laid in cement mortar—regular mason-work; that is the way they put

the most of it in. I got a letter from Brennan at the time that I was working, stating that I was working too many hands, and I was only working two stone-masons—what were called masons. I got a letter from Brennan, telling me to discharge one man, that one man ought to do it, and also telling me to discharge some of the hands; that I had too large a gang; that I had more laborers and less work than any of the rest. I didn't discharge them, though. I knew that it required more men to keep up with the brick-layers, and the packing was pretty heavy.

Q. What kind of packing did you put in while you were in charge there?—A. To the best of my knowledge it was all put in right; of course there were places where it was impossible to get the stone in good or solid.

Q. Why?—A. It would run up in small points like, and by the time it was filled up nobody could get in to pack those small points, where you couldn't get in; and if you put in small stones some places, there would still be little creases left where you couldn't get any stones in, as large as your hand; it would run to a sharp point. I couldn't watch the packing all the time, for I had to lay brick most of the time myself; but I believed at that time that the work was pretty well.

Q. How many feet in length were you foreman of there in that west shaft when you left it?—A. I think we started at 1,200. I suppose I was foreman of two or three thousand feet, say; I don't exactly remember the number; I never kept much account of what we were doing or the amount of work from week to week was put on.

Q. It is not more than 2,000 feet clear to Foundry branch from there, is it?

The WITNESS. That is, you mean all we put in?

The CHAIRMAN. No; I mean the west shaft, where you were at work there.

The WITNESS. About 600 feet.

Q. Do you mean to say that all that was good work?—A. To the best of my knowledge it was all good; of course I couldn't tell what I didn't see, but there was none of this here blinding about it; if we found any of that kind we would always have that stopped.

Q. Did you find any bad places while you were foreman?—A. Yes, sir. We had a man, a darky, by the name of Harper; he had left several places, not large places, but small ones. I notified him two or three times about it, and I finally called the inspector's attention to it, and he stopped him. Finally I discharged Harper. They used to go through, and would tell me how much work was being done over at one end and at the other end, and how much less work had been done where I was. They done that in order to push the work. They were always crowding and pushing the work.

Q. Where did you go next from that shaft?—A. I never worked any more after that.

Q. You only worked in the west shaft?—A. That is all; I never done any work in there this last year at all.

Q. You did not do any work at Foundry Branch?—A. This is what is called Foundry Branch; it was between Foundry Branch and west shaft, about middle-way, I guess.

Q. You only did about 600 feet?—A. About 600 feet.

Q. What time of the year did you leave there?—A. I left there when the work closed out; and I could have went back afterwards; Palmer wanted me to go back this year, but I didn't want to go back.

Q. Did you call the attention of Brennan & Emery, your employers

to these times when you would discover that some of the packers were not doing their duty?—A. No, sir.

Q. Did you mention it to the Government inspector?—A. Yes, sir.

Q. Did he himself at any time discover it?—A. Most always when I would be staying at my center getting ready to start I would step on a place and find a hole and sink down.

Q. That would be behind the side walls?—A. That would be behind the side walls; it wouldn't be packed solid; may be a stone would be laid in solid, but I might step on it and the stone would turn over; that is always the way I would find it out; I hardly ever was up on the arch except to put on the key; I most always done the keying of the centers myself; we always packed our arches solid up to the key, and when we would get the key in we would have the amount of stone put in right at the key.

Q. Did the Government inspector ever, himself, to your knowledge, call your attention to any of these packers?—A. Yes, sir.

Q. Before you had discovered their work yourself?—A. Oh, yes; that is, they were not putting enough cement in. They would try to hurry and push the work along, while it was heavy work; they wouldn't bed the cement down; they would throw stones in, and then would throw cement over it, and throw more stones in and throw more cement over that; they would just throw the cement in by the bucketful.

Q. What did you do after that?—A. I would tell them that that would not do; that they would have to put it in right or quit.

Q. Did you make them take any of it down and put it in again?—A. Oh, yes; they would all have to tear that up, and they would take that from that side and put it at the other side.

Q. I understand you to say that when you left that 600 feet or so, of which you were the foreman in putting it in, was good work?—A. Yes, sir; I thought it was all good.

Q. What would you think if you were to go up there to-day and be with the man who, the newspapers say, is sounding with a steel rod—a rod with which you would pound against the wall as you would against the wall of a house, to see whether it was solid or not—and you found on making inspection of the work that was done there that there were a great many hollow places in it?

The WITNESS. About how large?

Q. What would you think if you found him sounding in a place 5 feet square and half of it appeared to be hollow?—A. I would think it had been neglected by the fellows without my knowledge.

Q. But how could that have happened without your knowledge? Did you work at two ends?—A. Yes, sir.

Q. So that that might have happened at one end while you were laying brick at the other?—A. Yes, sir. You see, I didn't have a chance like an inspector has. I had to be running up and down; I would have to work myself, and keep the men at work at the centers, and then I would have to lay brick for myself, and have to work with the men.

Q. Was McNamara inspector of the men there?—A. No; Mr. Lannigan was inspector.

Q. Was he inspector during the whole time that you were at work?—A. Yes; the whole time I was at work there.

Q. Did anybody ever suggest to you to let the packing be done just as it might happen?—A. No. I had bricklayers at work there who had worked on the other lines, Mr. Sweeney and Duffy, we called him, and several other bricklayers. I used to discharge a good many brick-

layers; we couldn't get men enough to keep up and do the work. When I would call their attention to bad work I would tell them it would have to be stopped, and then they would say it was done so and so at the other end, and I would tell them that it couldn't be done that way at this end. They would want stones to be thrown in like they did at the other end. That is the way it would always be. After we finished up at the west shaft I was sent over to Howard University for two nights, and I was turning a center on the first or second night that I was there, and I looked and saw a couple of centers there that hadn't scarcely any backing in, and they were running regardless of backing, and I asked how it came that they were so far behind with the backing. A packer says, "packing?" I says, "yes;" he says, "We don't do no packing over here." Just that way. I don't know what he meant by it.

Q. Who was that foreman of bricklayers?—A. I don't know what his name was; I didn't know him; I was just sent over there for two nights.

Q. Who was the packer who spoke to you in that way?—A. I didn't know their names at all.

Q. Which direction from the shaft was that, east or west?—A. I don't know; you can find it easy enough; it was the last three centers that were finished last year; not this year. You could tell by the numbers.

Q. Was the Government inspector around there that night?—A. Yes, sir; he was there for about an hour.

Q. Did he see the thing that you saw?—A. Oh, yes; that was young Harper.

Q. He was the inspector?—A. Yes, sir.

By Mr. FAULKNER:

Q. Was that a colored man?—A. No; it is another man; a white man named Harper.

By the CHAIRMAN:

Q. What did he say about it?—A. He didn't say anything; I only saw him there about half an hour that night; I didn't stay to finish; I wouldn't work there any longer than the two nights.

Q. What became of that inspector?—A. He went out on top.

Q. Left the work?—A. Yes, sir.

Q. Did not go back that night, to your knowledge?—A. No, sir; I never saw him any more that night. He came in about 10 o'clock, and staid about an hour and a half or so, or something like that; I saw him once, and then he went out on top.

Q. How came you to stay so short a time over there when you were sent over?—A. I don't believe in that kind of business myself; I knew over two years ago something like this was going to happen.

By Mr. FAULKNER:

Q. Did you go over there expecting to stay longer?—A. Yes, sir; I was sent there to help them finish it all up.

By the CHAIRMAN:

Q. Did you stay until it was all finished?—A. No, sir; I only staid two nights.

Q. How long would it have taken to finish if you had staid?—A. It would have taken about two or three more nights; we were working night and day on it.

Q. When you quit did you inform your employers, Brennan & Emery?—A. No; they knew all about it.

Q. Did you say anything to them about it when you quit?—A. No, sir.

Q. Did you give them any reason for quitting?—A. No, sir.

Q. What makes you think they knew all about this thing?—A. Well, the way they would give it to us, tell us to "throw her in;" "pile it in." That was enough for me. Of course that was none of my business. I told Mr. Lannigan, our inspector, when I got acquainted with him the first month, that something like this was going to happen some day.

Q. When was that?—A. That was the last time I worked in it.

Q. Did you work anywhere after you left Howard University shaft?—A. No, sir.

Q. That was the end of your work?—A. Yes, sir; I haven't laid any brick since.

Q. What year was that?—A. 1887.

By Mr. DAWES:

Q. What do you mean by the remark that you told him something like this would happen some time?—A. That this wouldn't hold up, this tunnel wouldn't hold where these holes were left.

Q. To whom did you tell this?—A. I told it to Mr. Lannigan, our inspector.

Q. He was the contractors' inspector, was he?—A. He was the Government inspector, and he said yes. Those men would be talking about how large holes had been left at some places, and they would put bulkheads across, and leave nothing under the roof at all between the bulkheads. I judge there was a good deal of that kind of work done. I said, "There is nothing like that in our work."

Q. When you told this to the inspector what did the inspector say?—A. He said, "Yes; he didn't know whether it would or not."

By the CHAIRMAN:

Q. Was that the Government inspector you refer to?—A. Yes.

Q. What was his name?—A. Lannigan.

Q. I see by the time-book that you worked at the Howard University shaft two days in the week ending September 30, 1887; Tuesday and Wednesday.—A. That is two nights; that is the time that this bad work was done that I saw. That is the first I ever saw.

Q. You have mentioned one night when you saw Harper, the Government inspector, about two hours, and he went out.—A. That is the time.

Q. The other night who was the inspector?—A. I didn't see any the first night. He might have been there, but I didn't know him. The second night I was there I wanted a little more information, and I asked who the inspector was, and they said "that boy," and I asked where he was, as he hadn't come in yet, and directly he came in. I saw him that time.

Q. Were either Brennan or Emery, or both of them, present on either of these occasions?—A. No, sir.

Q. Was Palmer?—A. No, sir; Palmer had nothing to do with it then.

Q. Was anybody representing the firm of Beckwith & Quackenbush?—A. No, sir.

Q. Nobody was there representing them?—A. There was one man there, the boss brick-layer.

Q. Who was he?—A. I would know the name if I heard it called.

Q. John Miller is put down that week as foreman.—A. I believe that was the man, because his name was Miller.

Q. The other masons were, according to this time-book, Joseph Terrell and John Cuniff?—A. That may be the packer's name.

Q. The packer's name was Dennis Wrenn.—A. That is the man that said they didn't do no packing; he said, "We don't fill them kind of places over here;" he knew I was from the west shaft.

Q. Did you have any conversation with this foreman of masons, John Miller, about this work at that time?—A. The whole gang didn't suit me much. They talked to him just as they pleased; he had no control over them. I asked him about it, and he said they knowed it was near closing up time, and that they could say what they pleased. I told him then I wouldn't stay in there if that was the way it was run, if they did what they pleased. That was the way that that work was done the two nights I was there.

Q. They were all paid by the day?—A. Yes, sir.

Q. What motive, then, could they have for doing the work in that kind of a way?—A. Indeed, I don't know; they thought it was big pay and little work, I suppose, or something like that

Q. Did you ever know of any of the Government inspectors, or any of Mr. Quackenbush's superintendents, being paid for overtime, or any other sort of payment being made to them except their regular wages?—A. No, sir; I never knew anything of that.

Q. Did you ever hear of any such thing?—A. Yes, sir; I have heard of it through men talking.

Q. What did you hear?—A. That they received money; I don't know exactly what, but I heard it talked. I wouldn't like to say exactly, because I don't know; but I have heard it talked through there that they have stayed extra time or done extra work and got something; I don't know exactly what it was; it was nothing definite.

By Mr. DAWES:

Q. Where were you when you had this talk with the Government inspector about this matter coming up again some other time?—A. At the west shaft.

Q. Was that before or after you had been over to attend to the two days' work at the Howard University shaft?—A. That was before, and it was after I got acquainted with him.

Q. What did that refer to, if you did not have any bad work at the west shaft?—A. What I have said. I had had a good many workmen working for me that had been working at the other end; they would go to work there, and then the inspector would come along, and they would be shifted to some other place, and they would tell me how they had done over there. I told Mr. Lannigan "These fellows go over there and do this kind of work, and it is all going to be found out some day." I thought when they had the water in this last time it would have been found out.

Q. Then your conversation with him at the west end was with reference to work at the Howard University shaft, in regard to the work that was reported by the men?—A. These men were from Champlain avenue shaft.

Q. Then it was with reference to work at Champlain avenue?—A. Yes, sir; and Howard University, too; both them places.

Q. And how long before you went over to Howard University?—A. It was after we had run out.

Q. How long was this conversation before you went over there yourself?—A. I suppose it was in a month or so after I started in. When I started in, I started in to do what was right and the same way I had

done before. When I went to work there under Mr. Palmer we laid from 1,200 to 1,500 or 1,800 brick a day, to the man, and then Mr. Palmer said we hadn't done half a day's work. I said, "Mr. Palmer. do you know what a day's work is?" And he said, "Yes;" that a man ought to lay 2,000 brick a day in a shaft. I says, "You may know how to drive Italians, but you can't drive brick-layers in that way." That was the conversation. I reported the words to Mr. Brennan, and he said if that was the case the men shouldn't stay there, and the next Monday Mr. Brennan told me to take charge, that the men was gone.

By Mr. McMILLIN:

Q. How old was this inspector?

The WITNESS. Mr. Lannigan?

Mr. McMILLIN. No; The other one, Mr. Harper.

The WITNESS. I should judge, from his appearance, he was about seventeen or eighteen.

Mr. McMILLIN. I inferred he was very young, from a remark you made.

The WITNESS. He was a regular boy. I was surprised when I saw a boy inspector—a boy inspector on such work, one who hardly knew what stone-work was. I don't suppose the boy knew any better, only that he had to be in there.

Q. What age was the other one you mentioned?

The WITNESS. Lannigan?

Mr. McMILLIN. Yes.

The WITNESS. He is about thirty-eight or forty.

Q. Then he has had more experience?—A. He was a stone-mason.

Q. When were your suspicions first aroused as to the fact that the work was not being properly done, or was not to be properly done?—A. I was in there about two months, and it started from about June or July. We had a man that came over there and went to work, and he got to talking, and I got to talking there about the other inspectors, and men working under these same rules; and I went to Seventh street, where all the best brick-layers were at work, and found that there was a kind of continual buzz through the whole gang, about the way the work was being pushed, and that was when I got my suspicions aroused.

Q. You suspected, from the rapidity with which they were attempting to push the work, that the work was not what it ought to be?—A. Mr. Brennan wrote me a letter; it didn't seem like he had face enough to come to me himself, but he wrote me a letter and stated, "You have got more men than anybody else on the line and get less work done than is done by anybody else." I then showed that letter to Mr. Lannigan, our inspector. I had a notion to quit at that time, but he advised me not to quit. I also showed that letter to Mr. Dugan and several others and asked their opinion what to do, whether to quit and let him get somebody else or to remain; and they advised me to remain and get along the best I could. I told Mr. Lannigan then, as I had told him before, that if these men done that amount of work it was not done according to the specifications, and that it would be found out some day when this water was turned in. I thought they would find it out the other time when the water was turned on, but it seemed like the water didn't get strong enough. I have worked at arch work and tunnel work a good deal, as well as other different kinds of work in other cities, and I know that the pressure on the inside is a heap more than it is on the outside.

Q. When the tunnel was not being properly done, was it the custom of these inspectors to complain, or just to pass it over?—A. If they had reported it to me I would have had it righted as soon as the men knew how to do it. We didn't have the stone-masons to do that kind of work, but the most of them did the best they knew how; but I suppose if the men wanted to loaf awhile they would stop awhile, but they were not going to push themselves and work so hard.

TESTIMONY OF HENRY BOLAC.

MONDAY, *December* 4, 1888.

HENRY BOLAC, sworn and examined.

By the CHAIRMAN:

Q. What is your age?—A. Thirty-four last August.

Q. What is your occupation?—A. Tunnel man.

Q. Mason, builder, or what?—A. Miner.

Q. Where do you reside now?—A. On Eighth street; it is a new house and there is no number on it yet.

Q. When did you, if ever, begin work on the aqueduct tunnel?

The WITNESS. When did I first start work there?

The CHAIRMAN. Yes.

The WITNESS. I was there on the 21st of July, 1884.

Q. What kind of work were you engaged in?—A. I was engaged as a helper first, with a machine. I came from Pennsylvania, and went to their office in Georgetown, and asked for work there, as a machine runner and driller. They told me I would have to wait until the superintendent, Mr. Knowles, came in. I waited, and when Mr. Knowles came in I asked him if he wanted any more men, and he said he wanted a few more drill-runners. I asked him if there was any show for a foreman. He said "Have you had charge of men before?" I said, "Yes; in several places." He wanted to know where. I told him. "Well," he says, "I have telegraphed for a man to Pittsburgh, and we expect him here to-night, and if he don't come I will see what I can do Monday morning.". So he told me to report Monday morning to Champlain avenue, and he would see what he could do.

On Monday morning I went to Champlain avenue, and I found that the man had come from Pittsburgh. I waited there until Mr. Knowles came, and he said, "Our man has come from Pittsburgh, and I will put you to helping on a machine for a short time until I can give you a machine, and then we will see what we can do afterwards." So I went to work on those conditions for about a week, when I got a drill to run. I think I worked about two or three months running a drill in Howard University. We struck bad ground and it got pretty dangerous to go out and in under it, and I believe Mr. Coryell, the engineer, ordered it to be timbered. They telephoned over from the office, asking the foreman if he had any man that could timber, and the foreman telephoned back that he had a good machine runner, but he didn't know as he knew anything about timbering. So he came down, and he said to me, "Can you timber, Harry?" "Well," I says, "that depends on what money is in it, whether I can or not." "Well," he says, "if you can do it, it is better for you to go up there; you may get something better afterwards." "Well," I says, "I suppose I will have to go over and see about it." He says, "No, they have sent." "Well," I says, "I don't know anything about it." He said, "You had better go and go to work anyhow." So I went out and worked that afternoon.

The man that was in charge of the work at that time was named Patrick Healy, and he was sick. So that evening I went down to see him to get some instructions from him, and he told me to go and prop it up the best way I knew how. So I took another man in, and we put some plumb posts in the best way we could. We were working about that two weeks, I think. Then Mr. Healy got out. Then the tunnel was widened out for brick-laying. I worked at that for some time. One day Mr. Beckwith came in at dinner time, and he called me and said, "Harry, I have got a crow to pick with you; I want you to go over to Champlain avenue, at Howard heading, and see what you can do over there. We have got a man over there that thinks we can't get along without him, but I don't think he is so good. The work is hard, but if you can get the drilling done it will be all right." I told him I would do the best I could, and I went over there and got along very well.

Q. Did you do any other work there except mining work?—A. No, sir.

Q. Were you foreman of the miners?—A. Yes, sir.

Q. How far ahead of the lining did you keep, as foreman of the miners?—A. Different distances. At one time, and at the time I was timbering and enlarging the tunnel by masonry, they were pretty close to me, say within 100 feet, and sometimes 50 feet.

Q. That was over here near Howard University, was it not?—A. Yes, sir.

Q. What kind of packing were they putting in at that time?—A. Stone packing.

Q. Was it laid in cement?—A. Not at that time; it was dry packing.

Q. Did you see how they did it?—A. Sometimes I did, but more times I didn't.

Q. It was not your business to look after that?—A. My business was to look after the timber and to take up the bottom for masonry.

Q. Did you have any knowledge of bad work going on?—A. Yes, sir; I did.

Q. How did you get that knowledge?—A. I got it through the men employed on the work; I didn't see no specifications of the work; I didn't know but what they were doing the work all right, although I had been so long connected with work of that kind that I knew very well that this packing should have been solid.

Q. And you knew that it was not being done solidly?—A. Yes, sir; I knew many places where it was not being done solid.

Q. Did you ever have any conversations with any of the Government inspectors about it at that time?—A. Well, I couldn't say for certain, but I think I did with Mr. Tolliver or Tolbert, I think was his name. I think I mentioned to him one night that they were not doing it according to the contract.

Q. Whereabouts was that?—A. The work was done somewhere between 1,200 and 1,500, I think.

Q. What did he say?—A. Now, I can't remember what he did say; he kind of laughed it off some way.

Q. Was that at the time they were doing dry packing?—A. No, sir; it was just after they had taken the contract for the rubble packing.

Q. Did you ever hear of Beckwith & Quackenbush's superintendents, Brennan and Emery, or Palmer, say anything about it?—A. No, sir; I never did.

Q. Did you ever say anything to any of them about it?—A. No, sir.

Q. If you saw bad work being done, and knew or heard that it was

being done, why did you not mention it to your employers?—A. I didn't consider it my business.

Q. Were they there frequently themselves?—A. No, sir; they were not; that is, the contractors were not; the superintendent was there every day nearly, twice a day.

By Mr. FAULKNER:

Q. There has been some complaint made with reference to the size of the excavation being made other than it ought to have been made. Did that occur under your supervision?—A. No, sir; I don't think that it ever did.

Q. Were any complaints made with reference to putting too heavy charges of explosives in?—A. Yes, sir; there was.

Q. Was not that because those heavy charges resulted in making larger openings than were necessary?—A. Yes, sir. I didn't think that was what you meant at first. You see, there was a great deal of bad work where they would run out of the line, misunderstanding their business. I thought you meant that.

Q. Did you control the size of the charges that you put in after this notice was given?—A. I did, sir, before. I knew very well that heavy charges would shake the ground, and so for my own safety and for the safety of the men I tried to get it out with as little powder as possible, in order to keep the ground there.

Q. At what point in the tunnel were they when these errors were made in reference to the alignment?

The WITNESS. With reference to the line?

Mr. FAULKNER. Yes.

The WITNESS. You might say all the way from Howard University shaft in for about 1,000 feet; there was hardly any line kept at all; it was first on one side and then on the other.

Q. Whose duty was it to keep that line?—A. The foreman's.

Q. Did it result in curves in the tunnel?—A. Yes, sir.

Q. Were they subsequently rectified?—A. Well, the smallest of them was, say where it was only a foot or two deep, or something like that—they trimmed off the other side; but there was one place where it was somewhere about 10 or 11 feet out of the way, and when the mason work came along they throwed it in and just went along, that is, partly.

By Mr. DAWES:

Q. Was there no engineer to point out the line as you proceeded?—A. Yes, sir; there was.

Q. Who was he?—A. Mr. Coryell, and Mr. Holcomb was his assistant, I think.

Q. How came you to depart from the line if there was an engineer there to indicate where the line was?—A. He gave us those points every 50 or 100 feet, and then we would take our own line from them.

Q. And it was going from one of these points to another, 50 or 100 feet apart, that you made these departures?—A. Yes, sir; I should say they were 50 feet apart at the time.

By the CHAIRMAN:

Q. The line being straight, how could that happen?—A. The foreman that had charge of it at that time, I don't think knew anything about machinery.

Q. You were not foreman?—A. No, sir. They didn't know nothing about machinery. They were men that were used to doing hammer work in the mines, and in setting up the machine they naturally drilled

too far into the side. And then, after blasting, there would be so much smoke, and they were pushed so hard, that they hardly had time to set the machines in line for another blast, and before they would know it perhaps they would have taken two or three blasts out of line before they would discover it, and then they would go for the other side, and in a day or two that would be just about as bad. That is the way it happened.

By Mr. DAWES:

Q. Did the correcting of the alignment make these large spaces outside of the regular line?—A. It did in one or two places, but at this place we were driving a small heading, and when we came to enlarge a heading of course it reduced those large places. The tunnel at that time was only 7½ by 11 feet.

By Mr. MCMILLIN:

Q. Were there more than one of these places left out of line when they came to the alignment?—A. Oh, yes; there were several places.

Q. Were there any number of them that would amount to as much as three or four or five feet out of the alignment? You say there were only one to ten or eleven?—A. Yes, sir; just about the width of the tunnel. No, I can't state that it did go that much. Say, for instance, here was the line of the tunnel [illustrating], and the left-hand side of the tunnel came on the center. Come to think about it, that would throw it only about 6 feet out of line.

Q. But there were a number of places where it was thrown several feet out of alignment and left that way?—A. Yes, sir; I remember at one time we had to take off one lump in order to give the engineers a sight through.

Q. When did you first have your suspicions aroused that the work was not being done right?—A. At the time of the second contract with the masons.

Q. What then occurred to make you think so?—A. I understood that the packing was being laid in cement, and I saw that they went right on and kept it up with cement above, only at the end in each arch they plastered it over with cement, and once in a while used a pailful in the side.

Q. But a great deal of the work was left with the dry packing around, with occasionally some wet packing?—A. Yes, sir.

Q. With bulkheads and occasionally a bucketful of cement would be thrown in?—A. Yes, sir; I should say three-fourths of it was left that way.

Q. For what length of the tunnel would you think that continued?—A. I couldn't say, because perhaps one day I would be right with them all the time, and then it might be two or three days before I would be with them again.

Q. Where were the Government inspectors at these times?—A. They were there part of the time.

Q. Where were they the rest of the time?—A. On top, or some place else out of the tunnel.

Q. Did they stay out of the tunnel any considerable length of time while work was going on?—A. Yes, sir.

Q. They did not pretend to be there at all?—A. No, sir.

Q. For what length of time consecutively, should you say, the inspectors were out at any time while the work was going on?—A. I should say about five hours a day.

Q. Were they habitually out during some portion of each day?—A. An inspector would come about 9 o'clock in the morning, and then he would leave about 4 or half-past 4 in the afternoon.

Q. He would stay there about seven hours?—A. Yes, sir; and then go out for dinner time or lunch, and probably stay on top until about 1 o'clock.

Q. What time would he go out to lunch?—A. Twelve o'clock.

Q. And the workmen would be at work there all the time except the short period that they took their lunch in the tunnel?—A. Yes, sir.

By the CHAIRMAN:

Q. How many hours did the workmen work per day?

The WITNESS. The masons?

The CHAIRMAN. Yes.

The WITNESS. They worked nine hours, and the packers and helpers worked ten and sometimes eleven hours; the miners and other men in the tunnel worked eleven hours.

By Mr. MCMILLIN:

Q. You heard no complaint from the inspectors as to how the work was going on?—A. No, sir; we had some complaints from Mr. Coryell or Mr. Tolliver or Tolbert as to how the work was going on.

TESTIMONY OF GEORGE KENDALL.

MONDAY, *December* 4, 1888.

GEORGE KENDALL, sworn and examined.

By the CHAIRMAN:

Q. What is your age?—A. Twenty-seven.

Q. What is your occupation?—A. Bricklayer.

Q. Where do you reside?—A. I live at 809 Boundary street, northwest.

Q. How long have you been a bricklayer?—A. I commenced to learn the trade fifteen years ago.

Q. You learned the trade regularly?—A. Yes, sir; I worked for one man seven years.

Q. Were you employed in the Washington tunnel lining business?—A. Yes, sir.

Q. When did you begin work?—A. I commenced work in the fall of 1886; I don't know the time exactly.

Q. Who was your employer?—A. Mr. Emery.

Q. He and Mr. Brennan were the subcontractors under Beckwith & Quackenbush?—A. Yes, sir.

Q. Were you foreman of masons?—A. No, sir; not then.

Q. Where did you begin work?—A. I commenced work west of Champlain avenue.

Q. Champlain avenue west heading; that describes it, does it?—A. Yes, sir.

Q. How far west from the shaft was the work then that you began on?—A. I couldn't say, exactly.

Q. Well, about how far?—A. I should think 300 or 400 feet where we commenced. We put in a short piece between two pieces of brickwork; about 150 feet long that piece was; and then we went in 2,000 feet and came back in the same heading.

Q. Who was the foreman of masons when you first went to work there in the fall of 1886?—A. There wasn't any foreman when we started, any more than Mr. Emery; but after that Mr. Lucas took charge of us for a while there.

Q. Was Emery the subcontractor?—A. Yes, sir.

Q. You say that was Champlain avenue west in the fall of 1886?—A. Yes, sir.

Q. Your name first appears in this time-book as having been employed on the 12th of November at Champlain avenue; do you think that is about the time?—A. I think it is somewhere along about the time; of course I don't know exactly.

Q. And at that time Emery was the foreman himself?—A. Well, he was foreman himself; but he was not there very much. Some days he didn't come at all and other days he may have come twice.

Q. Who were the other men who worked there as masons with you?—A. William Kendall, a bricklayer, worked with me.

Q. Was there a Frederick Kendall also?—A. Yes, sir; but he only worked for a little while at times; only about two weeks.

Q. Do you remember John Malone, who worked there?—A. No, sir.

Q. How long did you work at that particular place, Champlain avenue shaft?—A. We worked there until the next spring some time; I should think we worked there eight or nine months.

Q. About how much in length of lining was made while you were working there?—A. About 1,400 feet, I think; I think it was between 1,300 and 1,400; I don't know within a few feet, but it was somewhere about that.

Q. What kind of packing was put in?—A. It was dry packing, and in lots of places there wasn't any at all put in.

Q. Was it not in 1886 when they changed from dry packing to rubble masonry?—A. Yes, sir.

Q. Did you see the dry packing put in?—A. Yes, sir.

Q. Did you see these vacant places left?—A. I saw lots of them; I didn't see them all.

Q. You saw some?—A. Yes, sir.

Q. Did you say anything about it to anybody at the time?—A. No.

Q. Why not?—A. It wasn't my duty, I don't think. The inspector was right there.

Q. Who was inspector?—A. Mr. Lucas was inspector at this time.

Q. What is his first name?—A. I think his first name is Thomas.

Q. Did you know another Lucas named Lorenzo?—A. No, sir.

Q. Did you say anything about it to Brennan or Emery, your superiors?—A. No, sir; they knew all about it.

Q. What makes you think they knew about it?—A. Because they seen it done lots of times, and helped to do it.

Q. Who was the walking boss of the head contractors at that time—the tunnel superintendent of Beckwith & Quackenbush?—A. I think Healy was walking in there at that time, but he never said anything to us.

Q. Patrick Healy?—A. Yes, sir.

Q. Do you think he saw it, too?—A. Certainly; he couldn't help it. I don't think there was a man in the tunnel that didn't know the way it was going on; they were bound to know it; sometimes they would be building a bulkhead wall at the end of a center that would take a whole day to build it up.

Q. To hide these vacant places?—A. Yes, sir.

Q. How was that bulkhead wall built?—A. It was generally with

dry work; sometimes they would put cement in; when they would put it in tight they would just plaster it up in front.

Q. Was it built of stone?—A. Yes, sir.

Q. How high was the highest bulkhead wall at occasional places that were not filled? How high was the largest one you saw?—A. I have seen places 8 or 10 feet high; there were places I couldn't reach standing under the arch, lots of them.

Q. Did any of these other masons who were there at work call anybody's attention to those?—A. No, sir.

Q. Was there any foreman of packers, any man who had charge of the packers, except the foreman and masons?—A. There was only one man doing that and laboring work; there was only one man that did it.

Q. What was his name?—A. His name was Dennis Wrenn; he was not a stone-mason by trade; he was a laboring man. I think he works at the gas-works now.

Q. This was Champlain avenue you were speaking of?—A. Yes, sir; but he didn't start for about two weeks. There was some colored man at first, and in about two weeks after that Mr. Dennis Wrenn came there; I think it was about two weeks.

Q. The last week in October Dennis Wrenn's name appears in this time-book; where do you say he lives now?—A. He worked there with us, and works at the gas-works now, I believe.

Q. You mean the Washington Gas Company works?—A. Yes, sir; he was working there, but I haven't seen him for a year past.

Q. Who was the Government engineer at this time when this Champlain avenue work was going on in the way you mention?—A. I think Coryell was the man then.

Q. How often did he come into that work?—A. I couldn't say.

Q. Did you ever see him there?—A. Oh, yes; I have seen him there a good many times.

Q. What would he be doing when you saw him?—A. I think he generally gave points there, and set forms; I think that was the most he done.

Q. Laid out the lines for them to work to?—A. Yes, sir. There was another man walking head inspector there—Kirlin.

Q. How often did Kirlin come in?—A. He came in most every day once a day, except Saturday. Sometimes, however, he didn't come for two days.

Q. Was this kind of work you are speaking of in any part of the work where Kirlin could see it when he came there?—A. It was, if he wanted to find it, I think.

Q. Did you ever say anything to him about it?—A. No, sir.

Q. You only spoke to Lucas?—A. To Lucas. Lucas was right there and seen it. For instance, sometimes we would build a wall up for 4 or 5 feet, or as high as we could reach, and then a man who would be pretending to be packing would get down and build the front up, and throw the stones in and fill it up level, and then bring cement and plaster it right over, just to hide it. If they wanted to find that out, all they had to do was just to shove the cement to one side.

Q. I understood you to say that you spoke about this to Lucas; did you say that?—A. No; Lucas was right there and could have seen it; he couldn't help it.

Q. Did you ever speak to anybody about it?—A. No, sir.

Q. Not even with these other Kendalls, your brothers?—A. Yes, sir; they knew all about it.

Q. Did you have any conversation with them about it?—A. Yes, sir.

Q. Did you ever have any conversation with anybody else except with these brothers of yours?—A. No, sir; not any more than the men who were working around there.

Q. Did you speak with them about it?—A. The working-men that were working there, yes, sir. There was a man named Tom Terrell, a brick-layer, working there at the same time, too.

Q. But you never mentioned it to Coryell, the engineer?—A. No, sir.

Q. Did you speak of it to Mr. Kirlin, the superintendent of inspectors?—A. No, sir; they never spoke to us about it; not at that time.

Q. They did not ask you any questions?—A. No, sir.

Q. Did they speak to anybody when they came in?—A. No, sir; they generally looked around and went right ahead; that is, Kirlin did.

Q. It was Lucas's business to stand by and see the work done, was it not?—A. Yes, sir.

Q. Did he stand around there and keep perfectly dumb all the time?—A. He was around there all the time and instructed the men what to do.

Q. He did talk, then?—A. Yes, sir.

Q. Do you mean that he instructed the packers to do it in this way or that way?—A. Yes, sir; they had to do it, because they didn't know anything about it, not before they were learned the way to do it; they never done that kind of work before.

Q. Did Lucas tell the packer or packers to build up these bulkheads to cover up the empty spaces?—A. That is what I understand; he said so.

Q. But did you hear him?—A. Yes, sir; I have heard him tell them what to do there, how high to build it up, and where to build it up; that is the 1,300 feet at Champlain avenue west.

Q. You knew that was the wrong way to put it up, did you not?—A. Yes, sir; I knew it was wrong.

Q. Knowing it was wrong, why did you not tell Mr. Kirlin, the inspector, or Mr. Coryell, when they came around?—A. Had I done that I would have been discharged in a minute.

Q. Did you work in any other part of the tunnel than Champlain avenue?—A. Yes, sir; I worked at Rock Creek west and Rock Creek east; that is, I worked at Champlain avenue east and at Howard University.

Q. You worked in three different shafts?—A. Yes, sir.

Q. How was the work done at these different shafts? Take Rock Creek first.—A. That was just the same.

Q. Who was foreman of masons there?—A. There was a bricklayer who was foreman, and he was from Boston; I forget his name; he was foreman at the time I worked there. I only worked there four or five weeks; it may have been longer.

Q. That was at Champlain avenue?—A. Yes, sir.

Q. And you worked at Champlain avenue until the next spring?—A. Yes, sir; it may have been on in warm weather. While we were working at Champlain avenue west sometimes we would be laying brick on the bottom, and I have seen Kirlin and Townsend and all there when we were putting them in, and they didn't take any notice; I don't know whether they didn't want to see it or not.

Q. When they were doing what?—A. I say when we were laying brick, when we should have been putting in knuckle brick to make the skew-back for our bench-walls.

By Mr. McMILLIN:

Q. Explain the difference between knuckle brick and ordinary brick?—A. Knuckle brick is about 4 inches square, to make the skew-back with, so as to lay the bench-wall. The last time I was at work there, when they would run out of knuckle brick they would lay ordinary brick, and Kirlin and Townsend and those other men, when they went through there, would see it, or at least have a chance to see it. I don't know whether they didn't see it or didn't want to see it.

By Mr. FAULKNER:

Q. You would lay common brick there?—A. Yes, sir; common brick or brickbats, or anything that would answer the purpose.

Q. How would that affect the permanency of the work?—A. I don't know as it would hurt it much, only it is not the right way to put them there

By the CHAIRMAN:

Q. Did you go directly from Champlain avenue shaft to Rock Creek shaft to work?—A. Yes, sir.

Q. There was not any interval when you were off?—A. There may have been two or three days; it wasn't long, though.

By Mr. DAWES:

Q. Was any Government inspector present when any bulkhead was building and which was afterwards plastered over?—A. Yes, sir.

Q. What was his name?—A. Mr. Lucas was at this place, and there were others at different places the same way.

Q. Mr. Lucas was present at this place when it was done?—A. That is, at Champlain avenue west.

Q. When a bulkhead, with vacant spaces behind it, was built up of dry stone and plastered over, he was present?—A. Yes, sir.

Q. Was any inspector of the contractors present at any time when that was done?—A. I think so; the contractors didn't have any inspector there.

Q. Was either of the contractors present when that was done?—A. No, sir; I never seen the contractors there.

Q. Who was this man who, when you were there, you said was as much foreman as anybody?—A. That was Mr. Lucas; that was the one that we got our instructions from.

Q. Was he a Government inspector?—A. Yes, sir.

Q. And gave you instructions about the work?—A. Yes, sir.

Q. Did anybody in the employ of the contractors direct your work?—A. No, sir, unless it was Mr. Emery; he came through there about once a day; he was a subinspector.

Q. Was he ever present when such a bulkhead was built?—A. Yes, sir; he helped to do it.

Q. He helped do the work?—A. Yes, sir.

Q. A bulkhead was built of dry stone with vacant spaces behind it and plastered over in front?—A. Yes, sir.

Q. And he helped do the work?—A. Yes, sir; I have seen him myself help to do it.

Q. On more than one occasion?—A. Oh, yes, sir; lots of occasions.

Q. How many times?—A. I couldn't tell you; whenever they came in there and they wanted to hide anything in there he would help; any of them would help.

Q. That was done at Champlain avenue shaft?—A. Yes, sir.

Q. Was it done at any other shaft?—A. Yes, sir.

Q. What other shaft?—A. East of Champlain avenue this last year, and at Rock Creek, both.

Q. You say east of Champlain avenue and at Rock Creek?—A. Yes, sir; and at Howard University.

Q. Now take the shaft west of this first Champlain avenue shaft that you have been testifying about—you have said that a bulkhead was built there in this same manner at a shaft west of this?—A. Yes, sir.

Q. What is that shaft called?—A. West of Rock Creek.

Q. Was it built in the presence of a Government inspector?—A. Yes, sir.

Q. What name?—A. His name was Masters.

Q. At that time, or at any time, had a contractor been present when that was done at that shaft?—A. No sir; I never seen Mr. Quackenbush in the tunnel but once, I think.

Q. Who was foreman of the brick-laying business at that time?—A. A man from Boston; I don't know his name.

Q. Was there a foreman of packers besides?—A. Yes, sir.

Q. Was he present when any such work as that was done?

The WITNESS. This Boston man, do you mean?

Mr. DAWES. Yes.

A. Yes, sir; they were all there.

Q. Did the Boston man help do it?—A. I don't think he laid any stone himself; of course he gave instructions.

Q. How large a space at the bulkhead at that shaft did you ever see?—A. I have seen places perhaps 10 feet square, and others maybe longer. I have seen places there frequently 6 or 7 feet high and 8 or 10 feet long, just the length of the center.

Q. That is the second shaft that you have been testifying about?—A. Yes, sir.

Q. Now take another. Have you seen it at another?—A. We worked at East Champlain this spring.

Q. What is that shaft called?—A. Champlain avenue east.

Q. At Champlain avenue east have you seen what you have testified to with reference to the other shafts?—A. Yes, sir.

Q. Dry stone built to a bulkhead, with vacant spaces behind it, plastered over with cement?—A. Yes, sir.

Q. And that in the presence of any Government inspector?—A. Yes, sir.

Q. What was his name?—A. His name was O'Brien.

Q. Was that more than once?—A. Yes, sir.

Q. How many times can you call to mind?—A. I keyed up about 100 feet under O'Brien at this place, and reported every night. When we were in generally at night——

Q. There was no foreman of packers there, was there?—A. Mr. O'Brien was foreman.

Q. And Government inspector too?—A. Yes, sir.

Q. Acting in a double capacity?—A. Yes, sir; he carried a time-book, and put men on and discharged them.

Q. And was in the employ of the Government as inspector besides?—A. Yes, sir.

Q. Did he help do any of the work on this bulkhead?—A. I have seen him throw a few stones in there; of course he would order me to go up and key up so much.

Q. Was there a foreman of brick-layers there?—A. No, sir; not at this time.

Q. Where were the brick-layers while this was being done?—A. There

was only one brick-layer working. Perhaps he would order him to go up and key up the center, and when they keyed up that center he would tell him to go back and fill up the time while they would pack that, and whenever they wanted him again they would send for him. Sometimes we would have three centers to key when we went in at night, and we would have two or three laborers packing; and they would put one at the end of the three centers and build a wall right up solid, and they would put up bulkhead walls at the end of every 14 feet until they come to the end, and then build up solid.

Q. How long did you continue to work after you saw these bulkheads put in?—A. I worked there about a year and five months.

Q. A year and five months in all?—A. Yes, sir.

Q. After you saw these bulkheads in how long did you continue to work?—A. They were doing it when I went there; that is the way they done it when I started.

Q. How came you to leave?—A. They got to shifting us; they wanted to scant the brick-work and wanted us to do about two days' work in one, and that was an impossibility.

Q. Did they discharge you?—A. No, sir.

Q. You left of your own accord?—A. Yes, sir; they sent for us this spring at Topeka, Kans., me and my brothers, to come on this work at this aqueduct, and we came on here and worked for them a little while; but we found that they wanted us to do two days' work in one, and that was an impossibility, although at the same time they wanted us to walk around and loaf about two or three days in a week.

Q. You mean without pay?—A. Yes, sir. They wanted us to loaf, too.

Q. Then you differed from them about your work, did you?—A. Yes, sir. They wanted us to put in about 5,000 brick. That was an impossibility.

Q. Did you have words with them about it?—A. No, sir. They wanted to put laborers with us on that night work, and we couldn't stand that.

Q. Did you leave them on that account?—A. Yes, sir.

Q. Was there any other cause for your leaving them?—A. No, sir. We told Mr. Hunter, a friend of ours, about it.

Q. Before you left, or at the time you left?—A. Just before we quit we told Mr. Hunter the way they were carrying the work on, and that we couldn't stand it.

Q. Was that before you finally left them?—A. Yes, sir.

Q. How soon after you told Mr. Hunter about the manner in which they were doing their work did you leave?—A. We left the next day; I don't know whether it was the next day or the day after; it may have been two days.

Q. Do you know whether that bad work had come to the knowledge of the contractors, in regard to which you told Mr. Hunter before you left?—A. No, sir; it hadn't. I know that it hadn't.

Q. Who is Mr. Hunter?—A. A friend of ours and an attorney at law.

Q. Not connected with the work?—A. No, sir.

By the CHAIRMAN:

Q. What is his first name?—A. James T. Hunter.

Q. Does he live in this city?—A. Yes, sir.

Q. Do you know his residence?—A. Yes, sir.

Q. Where does he live?—A. I haven't got his address; my brother William has it; he will give it to you.

By Mr. DAWES:

Q. How came you to tell him this which you had told nobody else before?—A. He was a friend of ours; we told him the way it was carried on, and that we could never stand the way they were doing it at this time.

Q. At the time that you finished up with your contractors and left the work was there any other matter talked about except the amount of work that they required of you?—A. No, sir; no more than that they wanted to put laboring men with us to do our work.

Q. Did you have any other difficulty with them?—A. No, sir.

Q. Did you have hard talk with them at that time?—A. No, sir.

Q. Did they pay you up to the time that you left?—A. They paid us for the work that we done.

Q. There was nothing left between you and them at the time you stopped work?—A. No, sir.

Q. Was there any hard feeling between you and them at the time?—A. No, sir; not any more than he was wanting to put laboring men with us and wanting to scant the work.

Q. Did he ask you to remain longer?—A. No, sir; as soon as we quit we told about the way the work was done.

Q. At the time that you told him you could not stay any longer, what reply did he make?—A. We didn't tell him; we just walked right out.

Q. You quit before you settled up?—A. Yes, sir; he laid us off there because they didn't have the things in the tunnel, and we had to wait a little while, and so we walked out.

Q. You say the reason you kept this to yourself was on account of the fear of being discharged?—A. We would have been discharged if we had said a word.

Q. And you told it to no man except this friend of yours. How long before you left did you tell it to this man, Mr. Hunter?—A. We told it the same week.

Q. Did you request Mr. Hunter to keep it?—A. No, sir; we told him it was an impossibility for the work to stand there, and that as soon as ever the water came in it would be found out, because I had worked in other works the same way, and I have seen only the river back up and seen the water sift right up.

By the CHAIRMAN:

Q. How long before you left the work was it that you told Mr. Hunter?—A. I told him the same week that I left.

Q. Was it before you left, or after you left?—A. I think it was about two days before I left; I don't know whether it was two days or the same day that I quit; I am not certain.

Q. Was it Brennan who was in charge then as contractor?—A. Palmer was on that end of the tunnel.

Q. That was after Palmer had required you to do more work than was possible, and then had asked you to lay off with nothing?—A. O'Brien would lay us off; it wasn't Palmer.

Q. He was keeping time for them at that time?—A. Yes, sir; he discharged the men and put them on and laid them off.

Q. How did it happen that you told this to another at that time and had not told him before? You say he was a friend of yours?—A. I don't know; I couldn't say. But I hadn't known him very long, not personally, before this last summer; I knew him before, but never mixed up with him very much.

Q. How long after you told Hunter was it that you made an affidavit

about this business?—A. It was about two weeks, I think, before we made an affidavit.

Q. How did you come to make an affidavit?—A. We preferred charges to Senator Ingalls, and he told us to make affidavits and hand them to the Secretary of War.

Q. You were Kansas men and knew Senator Ingalls; is that it?—A. No, sir; we don't know Senator Ingalls.

Q. How did you come to go to see him?—A. We were obliged to do it.

Q. He was chairman of the Committee on the District of Columbia?—A. Yes, sir.

By Mr. DAWES:

Q. And he told you to make these affidavits and send them to the Secretary of War?—A. Yes, sir; or to hand the affidavits to him and he would send them to the Secretary of War.

TESTIMONY OF WILLIAM KENDALL.

TUESDAY, *December* 4, 1888.

WILLIAM KENDALL, sworn and examined.

By the CHAIRMAN:

Q. What is your age?—A. Twenty-two.

Q. What is your occupation?—A. Brick-layer.

Q. How long have you been a brick-layer?—A. Between five and six years.

Q. You learned the trade regularly?—A. Yes, sir.

Q. Did you ever work on the Washington Aqueduct tunnel?—A. Yes, sir.

Q. When did you begin?—A. I commenced somewhere about September, 1886.

Q. In what shaft?—A. Champlain avenue shaft.

Q. East or west?—A. West.

Q. How long did you work there?—A. I worked there, as far as I can remember, about eight or nine months.

Q. Until away into the next summer, then?—A. Yes, sir; about July of the following year, I believe.

Q. Who was working there with you?—A. George Kendall.

Q. Any other brick-layer?—A. There was one brick-layer working there about three months by the name of Thomas Terrell.

Q. Was that in the first part or the last part of your work?—A. About the middle part.

Q. Who was your foreman?—A. The inspector, Lucas.

Q. Who had charge of the work?—A. He had charge of the men.

Q. Who kept the time-books?—A. He kept the time with the exception of about three months, when Terrell was there; then he was foreman; but Terrell quit the work then, and Lucas was re-instated.

Q. So that during the whole time you worked there, except when Terrell was foreman (which was three months, you say), Lucas had charge of and kept the time-books?—A. Yes, sir; he had.

Q. Who employed Lucas?—A. I suppose it was the subcontractors; I knew he kept my time and kept the time of the other workmen.

Q. Who were the packers during the time you were there?—A. Dennis Wrenn was the only packer while I was there, with the exception

that at times the laborers would assist him; in fact, he was only a laborer himself.

Q. But he had charge of the packing, had he?—A. Yes, sir; he had charge of the packing.

Q. Who was the Government engineer at that time?—A. Major Lydecker.

Q. But I mean the man on the spot?—A. Mr. Coryell.

Q. How often did Coryell come into the work?—A. I believe he was in there about every day, invariably every day.

Q. Did the subcontractors ever come in?—A. Oh, yes, sir; that is, subcontractor Emery did; I never saw Brennan, his partner, in there but once.

Q. Did you ever see Palmer there?—A. Palmer wasn't subcontractor at that time.

Q. Did Beckwith & Quackenbush, or either of them, ever come in?—A. I never saw them in there. I saw Mr. Quackenbush in there once, I believe, and only once, but I never saw Beckwith in there at all.

Q. Did their superintendent ever come along?—A. Yes, sir.

Q. The man who had general charge of Beckwith & Quackenbush?—A. I don't know that he was superintendent.

Q. Did a man named Pat Healy come around?—A. He came there occasionally, but very rarely; so far as I know, he was merely boss of the muckers; that is, the men that excavated the rock at the time.

Q. What other Government inspector was around there at the time, except Lucas?—A. Inspector Kirlin.

Q. How often was he there?—A. He was there most of the day.

Q. How long at a time did he stay, usually?—A. He was there when I left.

Q. But when he came in almost every day how long would he be at any one point?—A. He would walk right straight through; he never stopped where we were working over a few minutes at a time.

Q. Was the work going on in that shaft only at one point?—A. Only at one place at that time; that is, west of Champlain.

Q. That is what I mean.—A. There was work going on west of Rock Creek; they were excavating the rock on the other side of the shaft; there were no masons working there.

Q. How much lining was done while you worked in Champlain avenue shaft west?—A. I couldn't tell exactly, but I suppose there was 1,200 or 1,300 feet.

Q. And you, your brother, and Tom Terrell did all the mason work?—A. We did all the masonry; another bricklayer may have worked there a few days, but no great length of time.

Q. But you were the persons employed?—A. Yes, sir; we were.

Q. Was there ever any trouble about the cement being bad, or any trouble in regard to it in any way, while you were at work there?—A. No; the cement was pretty good, so far as I know.

Q. Did you see how the packing went on?—A. Yes, sir; I saw how a majority of it was done; of course I didn't see all of it; I wouldn't say that I saw all of it.

Q. How was the packing done?—A. Most of it was done dry, without any cement.

Q. Were all the places filled up with dry or wet or some kind of packing?—A. No; a cavity was left over the key of the arch. In most every center there were cavities left.

Q. How did they happen to get left?—A. The packer didn't pack them solidly, but made bulkheads.

Q. Why did he not pack them solidly?—A. That question of course I couldn't answer. The inspector saw all that was being done, and he never gave orders to have the holes filled up.

Q. How often did it happen that there would be places where they did not pack at all, or packed loosely, or put in stone dry?—A. The most of it was packed dry, and the cavities were left over almost every arch.

Q. That practice went right along, then?—A. Went right along all the time.

Q. You say the inspector saw it?—A. Yes, sir.

Q. Lucas?—A. Lucas, I mean.

Q. What did he say about it?—A. He never said anything to me.

Q. Did you hear him say anything to anybody else?—A. No, sir; unless if an engineer was coming into the tunnel he would generally have it covered up; that is, if there was any dry packing he would have cement put over it.

Q. What makes you think he had cement put over it for the purpose of hiding it? Can you remember any instance when he knew the engineer was coming?—A. The man that usually hauled the brick in was acquainted with Mr. Lucas, and he would say that the engineer was on top and would be in in a few minutes; and sometimes a little colored boy would come in the tunnel and tell him; and at other times Inspector Kirlin would tell him that the engineer was coming in the tunnel at a certain time.

Q. What would he do then?—A. He would usually have the work done right; have everything in readiness when the engineer came in. But if the engineers had investigated the work they could easily have found out what sort of work it was, because it was only covered over with probably an inch of cement on top of the stone-work. If they had uncovered it they would have found the dry packing.

Q. Did Lucas ever complain in regard to this packing, or direct it to be made right, except on these occasions when somebody was coming?—A. Yes, sir; at times; but it never lasted over a day or two.

Q. Then it would get bad again?—A. Get bad again; yes, sir.

Q. You say that on some occasions Kirlin would mention to Lucas that the engineer was coming?—A. Yes, sir.

Q. How soon after would the engineer appear?—A. Mr. Kirlin would usually come in earlier in the day on days when the engineer was going to make his appearance, and would tell Mr. Lucas that the engineer would be up in a couple of hours; and then he would go out of the tunnel and wait for the engineer to come, and come in the tunnel with him in his company.

Q. That engineer was Coryell, was it not?—A. Yes, sir; Coryell.

Q. Did Mr. Kirlin see this bad work?—A. Not that I know of; in fact, he very rarely got on the scaffold.

Q. When he saw it it would be necessary to get up on the scaffold, would it?—A. Yes, sir. I remember on one occasion, though, that the packer was building a sham wall, a bulkhead, and Kirlin came along and asked him how the work was being done up there; that was above the arch; the packer invited him to come up and inspect it, but Colonel Kirlin said he would come up when he came back; if he had got on the arch on that occasion he would have detected the sham wall or bulkhead.

Q. Who asked him to get up?—A. The packer, Dennis Wrenn by name.

Q. If the packer was doing bad work just then and there, why would

he have asked Mr. Kirlin to come up and see it?—A. I remember the occasion quite well, because he spoke of it afterwards, expecting him to come up, and he knew if he had come up of course he would have been sent out of the tunnel; he merely asked him to come up, I suppose, so as to leave the impression that the work was all right.

Q. Did you ever mention to anybody, in the time of it, that this bad work that you saw was going on?—A. No, sir.

Q. Why not?—A. The inspectors and subcontractors knew how the work was being done, and I didn't think it was my business to talk about the work. I was merely employed as a day workman.

Q. You do not appear to have known certainly that Mr. Kirlin knew it?—A. Not under that contract.

Q. That is the only time I am speaking of.—A. He had seen dry work going on.

Q. Where?—A. On the side walls; that is, behind the side brick walls.

Q. He had seen that?—A. He had seen that, but he always ordered it to be covered with cement.

Q. Did Kirlin order it to be covered over or to be made right?—A. To be covered over; and then he would enjoin the workmen in future to lay the work in cement, but they were not skilled enough to do that, and of course they couldn't pack stones in cement as they should be. They were incompetent to do it.

Q. Where did you work next, if anywhere, after you left Champlain avenue west?—A. At Howard University shaft.

Q. About what time did you go there?—A. Immediately after I left Champlain avenue. I can't remember exactly the time.

Q. Who was the person in charge there?—A. Samuel Kendall was the foreman of the gang where I went.

Q. Is he a relative of yours?—A. He is a brother of mine. I went to work under him, I believe, about two or three weeks. Afterwards a bricklayer named John Miller took charge.

Q. Who was Government inspector there?—A. Samuel Harper.

Q. How long did you work there altogether?—A. I guess I worked there about two months. I can't say exactly; I never kept account.

Q. What kind of work was being done there?—A. About the same as at Champlain, with the exception that there wasn't quite so many cavities left over the key of the arch.

Q. Who kept the time of the men there?—A. The bricklayer in charge.

Q. Harper did not?—A. No, sir; Harper was in fact in the tunnel about three hours a day.

Q. About how old was Harper?—A. There were two Harpers; one, I should think, was about thirty, and the other would be about seventeen or eighteen.

Q. Which of them was it that was the inspector?—A. This was the eldest of the two.

Q. And he was in only about three hours a day?—A. That is all.

Q. Did anybody take his place when he went out?—A. No, sir.

Q. While the work was going on nine or ten hours a day?—A. Nine hours a day; in fact I couldn't say positively how the packing was done over the key of the arch; I never keyed up any of the brick-work, and I was usually away in front working the invert, the bottom.

Q. Did you see any bad work, in the way of packing, done there?—A. I saw that most of it was done right.

Q. How many places were left vacant you did not know for the rea-

son you have stated?—A. I couldn't answer; I don't remember seeing any cavities left there at all.

Q. Did you ever see any bad work done when Harper was present?—A. Dry packing; yes, sir.

Q. What did Harper say about it?—A. He didn't say anything; he remained perfectly quiet; in fact, I think he allowed the work to be done that way, the dry packing.

Q. You are sure he saw it?—A. Oh, I am sure of it; yes, sir.

Q. Would the mortar that was put into this packing, if it had been packed right, be the same sort of mortar that was used for the brick-work?—A. No, sir; there were two different kinds of mortar.

Q. Where was it mixed? Was it mixed outside and brought in?—A. It was mixed outside dry, but the water was put in inside the tunnel.

Q. So that separate parcels of cement mixed with sand would be brought in, one for the brick-work, and the other for the stone packing?—A. Yes, sir.

Q. Are you sure that Harper saw this bad work going on?—A. Yes, sir.

Q. But you never heard him make any remark about it?—A. No, sir; I never heard him make any complaint.

Q. Did you ever hear him say anything to the packers?—A. I have heard him tell them to fill up the places solidly, but I never heard him tell them to lay the stone with cement.

Q. Was either Brennan, or Emery, or Palmer down there?—A. Emery was down there probably three or four times a week.

Q. Do you know whether he saw the bad work?—A. Yes, sir.

Q. What makes you think he saw it?—A. I seen him look at the work when it was in progress; when the bad work was being done.

Q. Did Kirlin come around there immediately at that section?—A. No, he never came to that section.

Q. You did not see him there?—A. No, sir.

Q. Did the Government engineer come there?—A. Yes, sir.

Q. Who was he?—A. Mr. Coryell.

Q. The same Coryell that we have been talking about?—A. The same Coryell.

Q. Did he see any of the bad work?—A. Not to my knowledge. In fact, when he would come there he would usually take pains to look.

Q. When did you first mention to anybody what you had seen about that work?—A. The first time I mentioned about this work was this year, after I got through; since September.

Q. After you left the work entirely?—A. Yes, sir.

Q. Where did you go to work next after leaving Howard University?—A. I left this city; I worked at the New York aqueduct afterwards.

Q. But I mean on this tunnel.—A. June of the present year.

Q. Did you stay in Howard University shaft all the time?—A. Until about a week before the work suspended.

Q. Then where did you go?—A. Then I went to Champlain Avenue shaft, east.

Q. How long did you work there?—A. I worked there for about, I guess, five or six weeks.

Q. Who was the foreman in charge of that place?—A. Mike McNamara. Lucas was the inspector.

Q. Who kept the time?—A. Mike McNamara.

Q. Did you see any bad work there?—A. No, sir; all the stone that we laid there was laid in cement; but they were not laid as they should

have been, because the men were incompetent; there were three packers working there; I couldn't give their names; I didn't know them. I worked about three weeks by the day in the day-time, and then I was transferred to the night gang, under Thomas O'Brien, who was working as inspector and also as foreman; he kept the time; he put on the laborers and also discharged them; the night gang's business was to key up arches, but the day gang got up the brick-work; and O'Brien ordered me to key up three bays at a time; that was a distance of 14 feet. Now it was an impossibility to do that after that distance had been keyed up 14 feet, because a man couldn't throw the stones back that distance, when some of the stones would weigh probably 300 pounds, as much as a man could lift. One night there was four arches keyed up, 56 feet, inside of nine hours; whereas if the work had been done properly it would have taken thirty-six hours to have done it.

Q. Was O'Brien there at that time?—A. He was there at that time; yes, sir.

Q. Was he keeping the time?—A. He was keeping the time; yes, sir.

Q. And inspecting the work?—A. Yes, sir.

Q. I suppose neither the engineers nor Kirlin were down there at night?—A. Not at night; I never saw them.

Q. You worked at this keying up?—A. At the keying up.

Q. How many other masons with you?—A. Only myself; I was the only brick-layer; I keyed up four arches.

Q. Fifty-six feet in one night?—A. Fifty-six feet in one night.

Q. How many bricks did you lay, do you suppose?—A. The number of bricks wouldn't amount to but a little over 1,000, I suppose; probably 1,200 or 1,300. The brick-work wasn't much, but the packing was very heavy.

Q. Did you see on that occasion that the packing was not put in?—A. Yes, sir; while I was keying up the bulkhead I had to wait until I completed the keying, and then I had to wait until the packing would be done.

Q. How long a distance would you key and then stop for the men to pack?—A. One whole center, 14 feet long.

Q. He knew perfectly well that it was impossible to pack it, and so did everybody else?—A. Yes, sir.

Q. Did you say anything about it to O'Brien?—A. O'Brien told me to key up three bays; he would see the way the work was being done; in fact, he told the packers to build the bulkhead across the front.

Q. When you got this keyed up what did you do then?—A. I would go out of the tunnel and go home.

Q. You do not know who finished it up?—A. No, sir; I don't know how they finished the rest of it.

Q. That was the last work you did?—A. No, sir.

Q. Where did you go?—A. I went to the day gang again.

Q. But in the same shaft?—A. Yes, sir.

Q. Who was inspector there?—A. Lucas.

Q. You went right back to the same gang where you had been before?—A. Yes, sir; but there was another inspector put there to assist Lucas, a man by the name of Woodward.

Q. How long did Woodward stay?—A. He left at the same time with Lucas; two or three weeks before I left that section; I couldn't say exactly what time; somewhere about August, I guess.

Q. Woodward staid there altogether how long, do you think?—A. He was there only about a month, I guess; about four weeks, as far as my memory goes.

Q. What kind of work was done while Woodward was there?—A. It was done well, that is, as well as they could do it.

Q. There were no vacant spaces left?—A. Not to my knowledge.

Q. You could have seen them if they had been left, just as well as you saw them before, could you not?—A. Yes, sir; but Colonel Kirlin would come in the tunnel occasionally, and he would say to the brick-layer that was in the key, "How many centers are you keying up to-day?" The brick-layer would probably say, "two centers," and Kirlin then would say, "You should key up three;" and if the brick-layer told him that that was an impossibility to get the stone in and to pack it, he would say, "There is enough stone here to pack three centers." And at the end of each month, when he would take the estimates, he would always measure some of the work that was not yet completed, and order the foreman to keep the gang there until he completed that work at night. Sometimes they had to stay there over-time, and were ordered to do an impossible amount of work, that is, they had to do the work, but it was never done according to the specifications; they couldn't possibly do it in the time it was supposed to be done in.

Q. You mean that the work would be imperfectly done?—A. Yes, sir.

Q. In what respect was the work done imperfectly?—A. Stones would be thrown in dry over the top of the key.

Q. Was that when Woodward was there?—A. Yes, sir.

Q. I thought you said awhile ago that the work was as good as they could make it while Woodward was there?—A. Yes, sir; I think it was as good as they could make it, but the men were incompetent. This work was probably done when Woodward was out of the tunnel; I couldn't say exactly. This was only on one or two occasions—probably at the end of each month. When Colonel Kirlin would measure the work to make his report to the engineer he would give in an amount of some work that was not completed—not keyed up, I mean—and then the men would have to work overtime in order to complete that work.

Q. And then they would slight it, you think?—A. Yes, sir; I mean to say that I never saw any stones thrown in dry in the holes—not in the presence of Woodward; I never saw him look on and see it done.

Q. Did you ever see him look on and see it done in the presence of Kirlin?—A. No; I never did.

Q. Did you ever see any thrown in dry in the presence of the foreman?—A. No, sir, not in the present year; the stones were laid in cement, so far as I could see.

Q. When was it that these stones were thrown in dry that you speak of?—A. Night after night, after 5 o'clock.

Q. Would not the foreman be there?—A. No, sir; he would usually be out of the tunnel.

Q. All would go, with the exception of the packers?—A. Yes, sir, and brick-layers.

Q. You went, too, did you not?—A. After I keyed up my brick-work; probably I would key up a couple of bays.

Q. That is the time the stone would be thrown over, was it?—A. Yes, sir; and that was on only one or two occasions, not to amount to anything.

Q. If there was nobody else but you to keep watch, and you supposed that Woodward intended to have the work done right, as you say it was when he was around as far as you could see, why did you not tell him, after the foreman had gone away and you were left to key up, that the packer did not do it right?—A. If I had told him that any bad

work was done, and if he had made complaint to the contractors or subcontractors I would have been immediately discharged. It wasn't my business to make any complaint how the work was being done.

Q. Did you do any other work after that on the tunnel?—A. Yes, sir; I worked about three days at Howard University shaft, and from there I went to Rock Creek, and I worked east and west for, I suppose, four or five weeks.

Q. What sort of work was done at Rock Creek while you were there?—A. Dry.

Q. Who was the inspector?—A. Martin McNamara, a brother of Michael McNamara.

Q. Martin McNamara was the inspector?—A. Yes, sir.

Q. Was there any bad work done there?—A. Dry; most of the work was done dry.

Q. Did he see it?—A. Yes, sir.

Q. What did he say about it?—A. He never ordered the workmen to do the work otherwise.

Q. Did you ever hear him make any remark about it at all?—A. No. sir; I never heard him tell the workmen to do good work.

Q. Did you hear him say anything about the work either way?—A. No, sir; I have seen him sitting there watching the men do bad work.

Q. When they were putting in dry work?—A. Yes, sir; when they were putting in dry work.

Q. Was that a regular practice while you were there?—A. A regular practice. I never saw any cavities left there after we left there. I was there only a short time, and I wouldn't know anything about that.

Q. While you were there that short time did you see any cement packing done there?—A. Oh, yes; I saw a little done. They used a little cement occasionally in spurts, as you might say.

Q. What made them do it in spurts, as you say?—A. I couldn't answer that question exactly, but I think it was done that way all along the line. They would build possibly four or five layers of dry packing and then put a layer of cement over the top; and then four or five more layers of dry packing, and continue that way all the time.

Q. But you did not say anything about it to anybody until after you left the work?—A. No, sir.

Q. How did you come to do it then?—A. They commenced to pinch me.

Q. How?—A. They wanted me to do an impossible amount of work; they wanted me to complete one center a day; that is about 3,000 brick, and that would have been an impossible amount of work to do, to do it right; and I made up my mind to quit.

Q. Did you quit on your own account then?—A. On my own account.

Q. How soon after that did you mention what you had seen?—A. About a day afterwards.

Q. To whom did you first tell it?—A. To my attorney, Mr. James T. Hunter. I took his advice, and he advised me to expose the bad work, which I did; my brother and I—in fact both of us.

Q. You spoke about his being your attorney. Did you have any litigation?—A. He is an attorney, and is a friend of mine; I really asked advice of him, and he advised me what to do; I had no lawsuit.

Q. You were not consulting him professionally?—A. No, sir; merely as a friend.

Q. What did you do after he gave you that advice?—A. I wrote a letter to Senator Ingalls.

Q. And that led you to make the affidavit?—A. I had an interview with Senator Ingalls, and he advised us to file affidavits with the Secretary of War; which we did.

By Mr. FAULKNER:

Q. You speak of Mr. Kirlin coming in there and only finding dry packing, and that he directed them simply to cover the top of it, as I understood, with cement?—A. Yes, sir.

Q. At what point of the tunnel was that, as nearly as you can fix it?—A. I couldn't give the exact point; it was between Champlain and Rock Creek shaft; it was just below the Crow's Nest.

Q. Was it the side wall or over the key?—A. The side wall; he scarcely ever got on the scaffold to see how the work over the key was being done.

Q. What distance along the wall was it that this dry packing was that he directed to be covered?

The WITNESS. Do you mean the width.

Mr. FAULKNER. Yes.

The WITNESS. That varied. The rock runs in and out.

Q. No; I mean in length.—A. It was about 25 feet long, according to the length of the invert. He frequently found dry packing; I never saw or heard him order anybody to pull it out again.

Q. You have never known him to do that?—A. No, sir. There was an assistant inspector named Briggs, who detected some bad work, I believe, at Rock Creek shaft.

By the CHAIRMAN:

Q. You were not there?—A. I keyed it up; it was only one night, though.

Q. Did he discover it while you were there?—A. No, sir; but he saw that and saw how the work had been done, and he knew it could not have been done right, and so he investigated it.

Q. How much work was done that night?—A. Twenty-eight feet had been keyed up without packing above the arch.

Q. But there was not nearly so much cubic space there as at the other 28 feet at the other place?—A. No, sir; but the excavation and space was, I suppose, about 10 feet high.

Q. So that there would be as much or more packing to be put in that 28 feet as at the other 28 feet?—A. Yes, sir; I keyed that up, and O'Brien was the inspector; he saw the work being done; in fact, I left him there when they were building the bulkhead across the front. Briggs detected that bad work on Monday morning, and on Monday morning, a little later, subcontractor Palmer came to me and prompted me what to say if Kirlin asked me about this bad work that had been detected. He told me to tell Kirlin, if Kirlin asked me about it, that O'Brien had left the tunnel sick that night.

Q. Palmer told you that?—A. Yes, sir.

Q. Whereabouts were you when he told you that?—A. I was working at Champlain avenue shaft.

Q. That was while you were actually at work?—A. He called me from the scaffold and told me.

Q. You were by yourself?—A. By myself.

Q. So that nobody else could hear you?—A. Nobody else was in hearing. But Kirlin did not ask me.

Q. What reply did you make to Palmer?—A. I didn't promise him either way.

Q. What did you say?—A. I told him how the work was done, and told him that I had left O'Brien there.

Q. That was in reply to his asking you to say that O'Brien went away sick?—A. Yes, sir; but Mr. Kirlin never asked me.

By Mr. FAULKNER:

Q. What was the height of this dry packing, on the side walls that you speak of, that was covered more or less with cement?—A. It would probably be 2 or 3 feet high.

Q. And what would be the average width?—A. The average width varied considerably along there, because on several occasions there was bad work found, and in some places it was 8 or 10 feet, and sometimes 10 to 15, and then again at other places only a few inches.

Q. He did not have the cement poured in there so as to grout it at all?—A. No, sir; he just had a layer of cement put over it; he would always tell the men to do good work in the future.

Q. You did not notice whether he especially called their attention to filling in the spaces between the inner points of the tunnel and the dry packing?—A. No, sir; not to my knowledge.

Q. How was that? Was it tightly packed?—A. The stones were thrown in there loose and dry; of course the stones wouldn't actually meet together as they should, so a little space would be left between them where they would not fit.

Q. But they came in contact with the sides of the tunnel?—A. Just as dry stones would; the stones wouldn't fit together closely as they should.

Q. And did he stand by and see cement put over it in that way?—A. Yes, sir; he did. Kirlin has seen whole bricks and bats used for knuckle bricks.

Q. Would that in any way affect the permanency of the work?—A. No; it wouldn't affect the work at all, only it was contrary to the specifications; the brick should have been cheaper than knuckle brick; knuckle bricks are small and expensive, as they have to be made according to order, I believe.

TESTIMONY OF FRANK W. CLARK—Recalled.

WEDNESDAY, *December* 5, 1888.

FRANK W. CLARK, recalled.

The WITNESS. You wanted the quantities of rubble masonry in the last contract of May, 1888. The quantity of rubble masonry, according to my estimate, is 13,910 yards. But I can make no comparison with the Government. Their estimates simply show linear feet of completed work, no quantities at all.

In regard to the quantities of brick-work, those I didn't get. The areas of brick-work and side-walls were fixed by the Government engineers, and in all my estimates I used the same areas that they fixed; so that I presume you have their quantities, and mine should be the same.

By the CHAIRMAN:

Q. This amount of rubble masonry that you mention is the packing, is it not?—A. Yes, sir; nothing but the packing. It does not include the side-walls or brick masonry.

Q. It includes the packing behind the brick masonry?—A. Yes, sir.

Q. Does that include the whole area, as far as the lining has gone, that you measured and computed, to be filled?—A. Yes, sir; up to November 4; that I think was the last day.

Q. But the contract includes all the space outside of the masonry lining and between it and the rock?—A. Yes, sir.

Q. Whether that space was really filled up or not?—A. Yes, sir.

Q. Do you know whether Beckwith & Quackenbush have been paid for that amount, less the amount of 10 per cent. retained?—A. I believe they were not paid the last two monthly estimates; I understand they were not.

Q. But before that they were?—A. Yes, sir.

Q. Was there anything else I asked you to tell me?—A. No, sir; I believe not.

TESTIMONY OF HENRY C. CHADWELL.

WEDNESDAY, *December* 5, 1888.

HENRY C. CHADWELL, sworn and examined.

By the CHAIRMAN:

Q. What is your age?—A. Forty-four.

Q. Where do you reside?—A. 2117 H street, N. W.

Q. What is your occupation?—A. I am a watchman.

Q. Working in whose employ?—A. At the Washington Aqueduct office, water department.

Q. Were you at any time employed in connection with the aqueduct tunnel?—A. Yes, sir.

Q. What was your duty there?—A. I was inspector of masonry and brick-work, packing, etc.

Q. From what time to what time were you inspector?—A. I was first employed December 8, 1884.

Q. How long did you continue?—A. I continued until June, 1885.

Q. And did that cover all your work at the aqueduct?—A. Yes, sir.

Q. You mean the masonry lining, I suppose?—A. Yes, sir; the arch work.

Q. Where was the work done during that period of time?—A. The first I done was at the extreme west end, connecting with the other reservoir.

Q. The western shaft?—A. Yes, sir; the western shaft. I inspected about 50 feet of arch work and then carried that shaft up to 72 feet, to the water line.

Q. What kind of packing was put in there?—A. Dry stone packing was called for.

Q. And that was the kind of packing that the contract called for at that time?—A. Yes, sir.

Q. How was that packing done?—A. It was done with the hammer, packed in by the men, as good as it could be done; it couldn't be done no better.

Q. Well done?—A. Yes, sir.

Q. Do you know or have you heard whether the inspection of the lining work seems to indicate any imperfection in that packing except where the contract calls for dry packing?—A. I only know what I have

read in the papers; there is an expert there to investigate that part of the tunnel, I understand. It is all first-class work, I think.

Q. Have you heard from any source that there is any fault in that work that you have inspected?—A. No, sir; it is pronounced by Coryell and Captain Symons to be first-class work at the far end; and when I got through my work it was so well done that I went to Howard University shaft; that was in April.

Q. That was in April, 1885?—A. Yes, sir.

Q. How much in length did you inspect there?—A. I think it was somewhere in the neighborhood of about 150 or 200 feet.

Q. How near to the shaft itself was that work being done?—A. It was 600 feet from the shaft.

Q. Which way?—A. It commenced about 600 feet west and worked east.

Q. And you think you inspected about 200 feet?—A. Yes, sir; somewhere in that neighborhood.

Q. And that was under the same contract, for dry packing?—A. Yes, sir; that was in 1885.

Q. How was that packing done?—A. That was the same; all good, solid packing; it couldn't have been done no better.

Q. How large were the largest places that were to be filled with packing?—A. Some places I suppose were 3 or 4 or 5 feet high—somewhere along there; the highest place run up to about 5 feet; the cross-sections will show that.

Q. Was that packed entirely safe?—A. Yes, sir; it was packed clear up to the wood-work, the cord-wood, etc., that was above it; it was packed up to that.

Q. That is the place they now call the Crow's Nest?—A. No, sir.

Q. Do you know any place by that name?—A. No, sir.

Q. How high was the roof of the tunnel itself above the bottom before the packing and the arch were put in?—A. Well, it was in the neighborhood, at some places, I think, of 11 feet; somewhere about that, and some places it was 12 feet.

Q. I mean the whole height of the rock.—A. Yes, sir; in some places up to the rock it would reach as high as 11 to 12 feet.

Q. The top of the brick-work would be nearly that high, would it not?—A. No, sir; the brick-work was in the neighborhood of 9 feet; somewhere along there; it was three-ring brick; I disremember about that now.

Q. How high there is the brick-work in the clear, inside?—A. I don't remember; I think was it 6 feet and something.

Q. It was higher than your head, was it not?—A. Yes, sir; 6 or 8 feet; very little higher.

Q. You are 6 feet tall, are you not?—A. Very near; yes, sir. I didn't have much to spare in there; I think my arch was a little over 6 feet; I think it was 6 feet 8.

Q. How high do you think the highest hole there was that you saw packed with dry packing above the top of the brick-work?—A. It was in the neighborhood of 7 or 8 feet.

Q. You spoke of some wood being put in.—A. The wood was in before we put the packing in; the wood was left in over, timbers and all.

Q. How high up did the timbering or wood go?—A. The timbering went sometimes as high as 6 or 7 feet.

Q. Above the top of the packing?—A. Yes, sir.

Q. And your packing, you think, was how thick there?—A. I think it was 6 or 7 feet in some places; it might have been more.

Mr. RYAN. Do I understand that between the top of the packing and the top of the naked tunnel there was a large space of that kind filled in with wood?

The CHAIRMAN. Yes.

By Mr. RYAN:

Q. How large?—A. Five or 6 feet in some places.

By The CHAIRMAN:

Q. How thick do you say you think the packing was that this timber and wood were over?—A. Some 5 or 6 feet.

Q. Why did you vary the thickness on top of the brick-work?—A. There was a measurement. Some places it run up in the middle from 4 to 5 and 6 feet and down to nothing almost.

Q. Right in among the timbers?—A. Yes, sir; some places it would be 2 feet, and others it would be 6.

Q. Depending on how the timbers were?—A. Yes, sir; depending on how the timbers were, and how it was put in before.

Q. That packing, then, was a mere pile of stone, was it not?—A. Yes, sir; it was packed as well as it could be, and hammered in.

Q. Yes, but it had not anything but wood in it?—A. No, sir.

Q. So when the wood would rot out, there would not be anything for the rock above the tunnel to rest against?—A. No, sir; we tried to have them taken out, but we couldn't do it.

Q. How long were you in there every day in your inspections?—A. I went there at 6 o'clock in the morning and staid until 12; and then went in again at 1 and staid until 6.

Q. What were they doing during that one hour at noon?—A. Eating dinner.

Q. Did any packing go on during that hour between 12 and 1?—A. No, sir.

Q. Sometimes you would go out and look around, would you, at that noon hour?—A. I would, for five or ten minutes; there wouldn't be any harm in that.

Q. How could you get out for five or ten minutes?—A. It wouldn't take me long to go down the shaft and come up on the cable.

Q. How deep was the shaft?—A. I think it was about somewhere in the neighborhood of 100 feet.

Q. In order to get to the surface you would have to go 600 feet along the tunnel, and then 100 feet up the shaft?—A. Yes, sir.

Q. You think you could go out and get back in ten minutes?—A. Sometimes I wouldn't stay much over ten minutes.

Q. You did not stay much more than ten minutes?—A. No, sir; going along the tunnel and up the shaft all would not be over fifteen to twenty minutes.

Q. You had to walk this 600 feet in the tunnel?—A. Yes, sir.

Q. And during those times you were out, the packing had to go on, I suppose?—A. Yes, sir.

Q. How high in general, after you left this timber place, was it from the top of the brick-work up to the roof of the tunnel?

The WITNESS. After we left the timbers altogether to the top of the roof, do you mean?

The CHAIRMAN. Yes.

The WITNESS. Sometimes it would be the same; sometimes it would be as high as 6 to 8 feet; it would average pretty much one thing; it didn't vary much; now and then there would be a large hole.

Q. Do you say that all that 6 or 8 feet was filled with stone?—A. Yes, sir; packed up as tight as it could be packed.

Q. You would be a good deal surprised, then, if it should turn out that there were vacant spaces there?—A. Yes, sir; there aint no vacant spaces; all the vacant space is at the edge, coming out from the timbers, and they won't find anything there to amount to anything. We had to have a man there shoving the stones in, and he shoved them as long as he could shove with a stick and reach in; I would do that myself sometimes; that couldn't be avoided no way at all. I spoke to the engineer about it.

Q. You could not reach in anywhere near to the walls of the rock?—A. Yes, sir; I would work at it as long as I could get my arm in to fill it with pretty good sized stones.

Q. You went in from the top of the tunnel; was it keyed up when you packed?—A. No, sir; we would brick the arch over together and key up, and keep coming out this way with it.

Q. How far out would you key up before you would begin to pack?—A. We wouldn't key more than 2 or 3 feet this way before we would bring it over solid and then be keying another; we wouldn't lay them in but very little at a time.

Q. How many feet in length a day would they lay of those bricks on this brick arch?—A. Sometimes they would lay 4 or 5 feet, and sometimes as high as 6 feet in the arch work.

Q. Is that all they would do in the nine hours?—A. No, sir; we would be putting in the bottom at the time.

Q. While the men were packing on the top they would be working at the sides?—A. Yes, sir; they would come up and pack, say on this side, and if it was large enough to pack they would fill in cement and brick-work, and while they were working on the other side the men would pack this side with the brick-work on the sides.

Q. Was there any other inspector there at Howard University shaft but yourself?—A. Yes, sir; Mr. Lucas was there and Mr. Hutton was there.

Q. With different gangs of men?—A. Yes, sir; Mr. Lucas was on top, and he looked out for the cement and brick coming down; that helped me a good deal.

Q. Did you have anything to do with inspecting the cement?—A. Yes, sir; I had to look out for the cement and see that it was all right; we would send samples to the office, and they would test them there.

Q. Do you remember any instance when any of the masons complained that the cement was bad?—A. No, sir.

Q. That there was too much sand in it?—A. Yes, sir; sometimes they would complain about the cement; they would kind of give me the wink that there was not cement enough in it, but I wouldn't let them use it until there was more in it.

Q. The cement was mixed dry at the top and brought down and wet up down there?—A. Yes, sir.

Q. But the cement and sand were put together on top?—A. Yes, sir.

Q. And brought down to where it was wanted?—A. Yes, sir.

Q. And then it was wet?—A. Yes, sir.

Q. You say the masons would sometimes tell you there was not cement enough in it?—A. Yes, sir; I would be up on the arch looking at the packing, and they would give me the wink or nod, that there wasn't cement enough in it.

Q. Who were the masons?—A. Oates, Garrity, and Harper.

Q. That was in the spring of 1885?—A. Yes, sir; April, May, and June.

Q. You got there what time?—A. In April.

Q. The last of April?—A. No, sir; about the middle of April.

Q. I see by the time-book that for the week ending April 10 that Imaly, Harper, Grene, and yourself were the masons; do you remember those?—A. No, sir; I don't remember no Greene; Imaly and Harper were there, and Oates.

Q. Who fixed the cement and sand at the top of the shaft there?—A. We had different men; I disremember their names.

Q. Did you have any control over the people who mixed the cement?—A. Yes, sir.

Q. Do you remember discharging anybody during that time in connection with the cement matter?—A. No, sir; Bennett was discharged, but the boss bricklayer discharged him; him and the boss bricklayer had some words, and I think the boss bricklayer discharged him.

Q. Who was the boss brick-layer?—A. Imaly.

Q. What did they have words about?—A. I don't know; it has been so long I don't remember. I think it was about cement. I think I complained about cement; that I didn't think there was enough cement in the sand, and I think he said he didn't think so either. I think that is what they had words about. Mr. Lucas helped me; he was on top, looking out for the cement.

Q. Which Lucas?—A. Old Mr. Lucas; the old gentleman.

Q. Is his name Thomas Lucas?—A. Yes, sir.

Q. Then there was a mason whose name was Lorenzo Lucas?—A. Yes, sir.

Q. Was he a son of the other Lucas?—A. Yes, sir.

Q. Who kept the time of the masons, the packers, and so on?—A. The brick boss and the boss for the contractor, Mr. Healy.

Q. You did not keep time?—A. No, sir; I didn't have nothing to do with it.

Q. Did you get anything in any way from the contractors or subcontractors?—A. No, sir.

Q. They have never made you any present, or given you any money or other valuable thing at all?—A. No, sir.

Q. Where did you go after you got this 200 feet inspected?—A. I quit and went to Virginia on a survey.

Q. That is, you quit of your own accord, while the work was going on?—A. Yes, sir.

Q. Who succeeded you?—A. Sam Harper.

Q. A mason?—A. Yes, sir.

Q. After you quit did you do any further work on the tunnel at all?—A. No, sir.

By Mr. RYAN:

Q. When you went out of the shaft, as you did occasionally, and would be gone perhaps twenty minutes at a time, as you state, for what purpose did you go out?—A. Sometimes I would go to the water-closet, or to look after the cement, or for a little fresh air.

Q. You went out on duty?—A. Yes, sir; on business; it is impossible for a man to stay down there all the time.

Q. How frequently would you go out?—A. Perhaps once a day; maybe twice.

Q. Not very often?—A. No, sir; I had to stay right there to get the work done. I used to have a little stick that I carried with me, and if I suspected anything about the work I would shove the stick through, and sometimes I would find it all right and sometimes I wouldn't. I

always carried a little stick. I had to watch a darkey right sharp; but this man Wrenn was a splendid packer, and I didn't have to watch him at all; he was a splendid worker.

Q. That would happen while you were passing in and out of the shaft?—A. Yes, sir.

Q. Did that happen frequently?—A. Oh no, sir; maybe once in two or three weeks. Sometimes I would go up and stay half an hour and then come back, but the darkey would hurry up and leave a little place sometimes.

Q. Did you detect any serious defects of packing of that sort?—A. No, sir; just small places; it wouldn't be anything but the least bit of a hole; maybe they wanted to make a little better show when they were hurried; that was all.

TESTIMONY OF LORENZO A. LUCAS.

WEDNESDAY, *December* 5, 1888.

LORENZO A. LUCAS, sworn and examined:

By the CHAIRMAN:

Q. What is your age?—A. Thirty-four.

Q. What is your occupation?—A. My occupation generally is bricklayer. I have been at it now nearly twenty years.

Q. Where do you reside?—A. 2155 Pennsylvania avenue.

Q. Were you employed at any time on the Washington Aqueduct tunnel?—A. Yes, sir.

Q. When did you begin work there?—A. I think it was about the 28th or 29th of December, 1884.

Q. At which shaft?—A. At the Howard University shaft.

Q. How long did you work there?—A. I worked there that winter at journey-work, laying brick.

Q. When did you leave the Howard University shaft work?—A. It was some time in the spring; I don't remember the time. I know there was ice about.

Q. The spring of 1885?—A. Yes, sir.

Q. How much of the brick lining was laid there at the work that you were connected with during that time?

The WITNESS. At Howard University?

The CHAIRMAN. Yes.

The WITNESS. There wasn't any brick lining only at the shaft.

Q. You did not work down in the tunnel, then, during that winter?—A. No, sir; not during that winter; I was then inspector of the tunnel on the Champlain avenue.

Q. Next after you left the work in the shaft proper at Howard University you became inspector at what shaft?—A. At Champlain avenue west.

Q. When did you begin there?—A. In the spring of 1885; I left there on the 1st of August, 1885; I got sick there.

Q. Were you in the east heading or the west?—A. West.

Q. How far from the bottom of the shaft west?—A. I think we started somewhere in the neighborhood of about 200 feet from the bottom of the shaft.

Q. Which way did you work?—A. We worked west.

Q. How much work was done in the way of lining while you were there as inspector at Champlain avenue west?—A. I couldn't tell you;

my books would show what was done; I don't remember what was done; I haven't been in there for about four years next August.

Q. Where are your books?—A. They must be in the office.

Q. Did you make daily reports?—A. Weekly reports.

Q. What did your reports show? how much work had been done?—A. How much work had been done.

Q. Can you not give us a general estimate of about how much length in all was done while you were in there?—A. I can't remember now; I don't remember now how much work was done.

Q. Can you not guess it was a thousand feet or five hundred?—A. I don't think it was a thousand feet; I am nearly sure there wasn't any thousand feet done.

Q. What kind of packing was used at that time?—A. Dry packing.

Q. That was under the first contract?—A. That was under the specifications. The specifications called for dry packing over the stones and in the tunnel.

Q. How large was the largest place that you remember above or at the side of the mason work of that lining, and between it and the rocks in the parts you inspected; that is, Champlain avenue west?—A. I can hardly tell now; there were some very large places and some very small places.

Q. How large should you think the largest place was?—A. Probably about 8 or 9 or 10 feet. There were some places where it was continually dropping all the time, and we were almost afraid to go under it. Sometimes it would drop down a bushel and sometimes a cart-load. Sometimes I would fire off a shot and take off, say, from 14 to 15 or 18 inches. When we would fire off a shot it would come off the whole thing right out; if we would fire one shot the whole thing would drop down.

Q. What do you mean by firing a shot—making a blast where they were mining the tunnel?—A. Yes, sir; and probably a piece would hang down like this [illustrating] probably from 6 to 8 feet long; the stones were all keyed in just like they were jointed, like stones laid in this building, with soapstone, and if you fired a shot and only wanted to take off one or two feet to get the tunnel straight or true, there would be seven or eight car-loads drop right down.

Q. How was this packing done while you were inspector?—A. It was done as good as could be done, or according to the way the specifications read.

Q. Were the spaces all filled up?—A. Yes, sir; as far as I know; I was on top and below.

Q. You were there for the purpose of watching?—A. Yes, sir; but no man could watch two places at the same time.

Q. You had two places to watch?—A. Yes, sir.

Q. How far apart were those two places?—A. Sometimes 500 feet, and sometimes 1,000 feet. My orders were direct from Mr. Coryell to watch the cement, and see that it was made up all right; and then I had to go on top to watch the cement made on top, and then come down and see that it was made up right there.

Q. And besides that you had to inspect the packing?—A. Yes, sir.

Q. And the two places where work was going on were sometimes 500 or 1,000 feet apart?—A. Yes, sir; my starting point was at least 200 feet or more from the shaft, and then I would have to go on top and inspect the mortar and see that the cement and sand were put in correctly; if I didn't I would be left. I suppose I was about nearly the only brick-layer that knew mortar when I got hold of it.

Q. Do you mean to say that mason work was being laid in two different places at the same time that you had to inspect?—A. No, sir.

Q. You had to work at two places, one of them being at the top of the shaft, to see that the mixing of the cement and sand was all right?—A. Yes, sir.

Q. And then you had to be 200 feet in the tunnel, where the masonry was being laid up?—A. Yes, sir.

Q. How long would you have to be absent from the masons who were at work down there when you were up on top to inspect the mixing of the sand and cement?—A. Probably an hour, or probably two hours; and then I had to inspect the brick. There were men around that didn't know a notch brick from a salmon brick, nor red brick from any other kind. My instructions were that all brick that came there to be put in the tunnel that were not fit to be used were to be removed, and in some cases I had to have them taken away. When brick would come I would be notified that they were there, and I would have to inspect the brick before they were dumped; and there would be a kick about the brick if I didn't inspect them before they were dumped.

By Mr. RYAN:

Q. On your return to where the masons were at work after you had been absent attending to your duties at the top of the shaft, did you make an examination usually of that work that had been done in your absence?—A. Yes, sir.

Q. Did you ever find it defective?—A. Yes, sir; I had lots of work torn down and put up according to my satisfaction.

Q. Then it was their custom to take advantage of your absence and put in defective work while you were gone?—A. I don't know that it was their custom, whether they intended to do so or not.

Q. But the fact was that they did it?—A. The fact was that sometimes they were bad workmen, and I had to drive them out of the tunnel entirely.

Q. It was frequently the case that during your absence there was bad work done?—A. I don't know whether it was during my absence or not.

Q. Could they put in bad work during your presence, when you were on the spot?—A. Oh, no, sir; not in my presence.

Q. Then when was this bad work done?—A. I don't know whether there was any bad work done while I was there, only when I struck the center I cut the work out and put it in good shape.

Q. Perhaps I misunderstood you. I asked you a little while ago if, upon your return from the top of the shaft to where the work was done, you inspected the work that had been done in your absence. I understood you to reply that you did frequently, and found it bad work?—A. You can't find bad work only when I struck a center. I stood and watched the work myself, and laid it off to a line with a pair of compasses, and had the work started at 2⅝ inches to the course with a pair of compasses. The only way you could find bad work was to stand on top and watch; some places it was too narrow to stand.

Q. That is the only way you could discover it?—A. Then you could discover the bad work after you struck the center, but I would make them cut it out afterwards, cut out that brick-work, and make it good.

Q. When would they put in that bad work?—A. They cut it out on the center.

Q. In your presence or while you were absent?—A. They cut it out in my presence, but you could hardly perceive it. I couldn't exactly explain it to you. When I went to work there I told them that I wanted

this work laid to a line. He said he had never heard of such a thing in his life. He said, "You lay the brick on the arch any way." I said, "You don't do it that way." I said, "I've had my time in brick-laying, and have been at it a number of years, and these specifications call for first-class work, and that is to lay work to a line with compasses;" and I bought a pair of compasses and laid them off to a line. There is no first-class work that is not laid to a line. If you didn't watch the workmen they would get mortar under the brick, something I never heard of in my life. I worked on the Patent Office and Pension Office and the State, War, and Navy Department, and there it was as good as a discharge for any man to have mortar under the brick; you had to have a clean arch, with no stain on the brick, the same as if you laid brick on the front of a building. I had them laid that way until I got sick and left. I wasn't either discharged or had any bad name.

Q. Now you are talking about the brick; but how about the packing that was done while you were absent at the top of the shaft?—A. So far as I could see, that was as good as packing could be done.

Q. When you returned from the top of the shaft did you ever inspect the packing that had been done in your absence?—A. Yes, sir; I would sit right on top of the arch with a lamp in my hand and watch it.

Q. Did you ever find any defective packing?—A. No, sir; I never found any as I know of; I tore down work that was done at night, and I ordered no night work to be done; I tore down about 6 feet of packing and had it put up again, and had to pay for it myself.

Q. Then the packing filled all the vacant space?—A. All the vacant space, so far as I could see.

Q. As far as you inspected?—A. Yes, sir.

Q. Did you ever have occasion to criticise the work of packing at all in this process?—A. Oh, yes, sir; I have already told you that I had occasion to criticise it and tear it out.

Q. That is what I understood you awhile ago, and yet I understood you to say that you did not find any defective work.—A. I have told you that I tore out some packing that I didn't think suited me, and I had to pay for the repacking of it myself. It was done at night, in my absence, and I tore out about 6 feet of it, and I had to pay for the repacking of it out of my own pocket.

Q. How many instances were there of that kind?—A. That is only one kind. I had my doubts about it, and they told me to tear it out if I would pay for the repacking of it at my own expense, and I had such doubts about it that I tore out about 6 feet of it, and tried to ram back with a rod, and couldn't find any hollow spot, and so of course I couldn't get out of paying for it out of my own pocket.

Q. You say you went there in the spring of 1885; how long did you continue?—A. I was taken sick, I think it was the 1st of August, 1885, and left there.

Q. How many men were at work while you were inspecting it there?—A. Probably sometimes two brick-layers, sometimes three, and sometimes four.

Q. How many packers?—A. They didn't have any packers; the brick-layers were packers.

Q. The brickl-ayers did both kinds of duty?—A. Yes, sir; they did the packing themselves; sometimes they would have a laborer packing stones up, but as a general thing the brick-layers did the packing themselves; they only allowed them to build so much, and pack it as they went along.

Q. Usually about how much space would exist between the brick and

the top of the excavation?—A. That would vary sometimes from a foot down to nothing; sometimes the brick would run hard against the stone, and then sometimes it would be as high as 10 or 15 feet.

Q. To fill in?—A. Yes, sir.

Q. What was the occasion of that great variation from 1 to 15 feet? Take a place where there was a vacancy of 15 feet in height above the brick, between the brick and the top of the excavation.—A. Sometimes they would strike hard stone, and sometimes they would strike regular mush.

Q. In excavating?—A. I don't know anything about excavating.

Q. I do not believe you understand me. The place where this packing was put in was above the brick.—A. I understand that thoroughly.

Q. I want to know how high that was generally?—A. You couldn't tell anything about it; some places it was hard stone and some places it was soft mush, fine crushed stone, just like rotten rock, and wet. You might get into a place where it would be solid and hard as iron, and probably in 2 or 3 feet it would be soft and mushy, kind of rotten rock, that would drop down by the ton.

Q. Drop down into the bottom of the tunnel?—A. Yes, sir; some places it would be like hard rock and some places it would not; some places it would look like it had been laid with a fine joint, almost as if it was one piece by itself, and then there would be four or five cart-loads drop down.

Q. Some of this work was done in the night-time, was it not?—A. What little work that was done in the night-time was about two or three nights' work there.

Q. That was all?—A. Yes, sir.

Q. Did the same kind of work occur there in the night-time?—A. Yes, sir.

Q. Who was present to inspect or supervise the work done in the night-time?—A. These two or three nights I was there, and the nights I speak of, about filling this packing that I had to pay for, that was done at night.

Q. Were you there then?—A. No, sir.

Q. You were not there that night at all?—A. No, sir.

Q. Was anybody there to supervise the work that night?—A. No, sir.

Q. Was it your duty to be there?—A. No, sir.

Q. Nobody was assigned to the work of inspection on that occasion?—A. No, sir. I was ordered afterwards to be there at night-time, and I never even got paid for it; three nights I was there, and was ordered there from the Government office, and I never got a cent for it, either.

Q. Three nights you were on duty as inspector?—A. Yes, sir; only between two and three hours. I think it was about twenty-six hours that the Government never paid me for.

Q. Then on these three nights you speak of when you were there, you were there only two or three hours each night; is that right?—A. I put in, I think, twenty-six hours altogether at night-time that I think somebody ought to pay for, but I never have been paid for it.

Q. Can you tell me about how long you remained there each night?—A. I put in twenty-six hours at night-time in all; that is the only night work that I know of, and I complained about it.

Q. And you were there three nights?—A. More than three nights; I couldn't put in twenty-six hours in three nights.

Q. Now, will you be kind enough to tell us how many nights you were there on inspection service?—A. I don't remember, but I know I had on my book twenty-six hours of night work altogether.

Q. How long would you remain each night?—A. That is pretty hard to tell; I know I put in twenty-six hours; I don't remember how long; twenty-six hours I had on the book.

Q. I understood you to say a little while ago that when you were on inspection service in the night-time you only staid there two or three hours.—A. It was more than that.

Q. Tell me as a matter of fact how long you remained there on inspection service in the night-time?—A. I had some twenty-six hours that I put in; I don't remember exactly how many nights; it has been some time ago; I never kept that matter in my mind. I was there somewhere near about twenty-six hours different nights; probably sometimes it would be 10 or 11 o'clock at night.

Q. Sometimes you would stay until 10 or 11?—A. Yes, sir; and sometimes I would stay only one or two hours at night to watch the keying of the arch. I staid there in the night-time previous to getting any orders to stay there at night. The only time I staid there was three nights after I got orders to stay there, and when I told you about having to stay there at night-time they gave me orders from the office that I should have to stay there at night; I had been there before having orders to stay there.

Q. I am not talking about your orders; what I want to know, and have been trying to get at for some time, is how long you remained on inspection service each night in the night-time. I understood you to say that sometimes you would leave at 10 or 11 o'clock?—A. I couldn't remember to save my life.

Q. Did you stay there the entire time that the men were working in the night?—A. Some nights I didn't stay at all.

Q. The men were at work with no inspector?—A. With no inspector at all.

Q. Was that frequently the case?—A. It was the case until I told them I wouldn't stay more than an hour or so, to give them a chance to key up and pack an hour or two. I says, "I won't stand it any longer;" but in spite of my saying that I wouldn't have it, they did it anyhow. That is why I tell you about tearing down some work that I had to pay for myself. I tore down some 5 or 6 feet and had to pay for the repacking of it myself, and they went over and got orders from the office that I should stay there, and then I staid there altogether the entire time, about twenty-six hours.

Q. How long were the men engaged on night work there?—A. I couldn't tell you.

Q. Give some sort of a guess.—A. Probably not more than five or six nights, may be more; I couldn't tell you exactly. I tried to stop that night work without they had two gangs, all day gangs; there wasn't two gangs working at night.

Q. You do not mean to say that the same gang that worked during the day worked at night?—A. Oh, yes; the same parties; they worked sometimes until nine and ten o'clock at night, and were paid for their time.

Q. And it was frequently the case that they had to work at night without any inspector?—A. Oh, no; it wasn't frequently; it was only now and then.

Q. Sometimes they had to?—A. Sometimes they would strike a bad place where it was very wet, and they would try to get through.

Q. You gave them notice that you would not remain on inspection in the night-time, did you?—A. Yes, sir; and I got orders from the office that I should remain.

Q. Was some night-work done before you gave them that notice?—A. Yes, sir.

Q. What did they do after you gave them notice that you would not serve as inspector in the night-time? Did they furnish another inspector?—A. No, sir.

Q. Did they give you any instructions then?—A. I got orders from the office that I would be compelled to stay.

Q. Anyhow, notwithstanding your protest?—A. Yes, sir.

Q. How much of that work was done in the night-time, what proportion?—A. I hardly remember now how much was done when I protested against the night work. I tore down portions of the work that was done in the night-time, as I told you before, and I was threatened to be killed; all they had to do was to kill me.

Q. Who threatened to kill you?—A. Some of the workmen whose work I tore down; I tore it down at my own expense.

Q. I understood you that that happened only once?—A. That was only one time.

Q. And you put that back at your own expense?—A. Yes, sir.

Q. What was the cost of putting that back?—A. About $1.50 or a couple of dollars, I think it was.

Q. Very little of it, then?—A. There wasn't much of it.

Q. But enough to make it very defective?—A. They kicked against me being allowed to work at night, and I still continued to be after them if they did any work at night; I should continue to tear it down.

Q. Then let me ask you this question: Could those men who were at work there have done imperfect packing in the night-time when you were absent without you being able to detect it when you went back?—A. Oh, yes, indeed.

Q. So you can not say how much defective work they did in the night-time?—A. No, sir; I couldn't say; when I was there at night I would have to go on top sometimes.

Q. Do you know Thomas Lucas?—A. I guess I ought to know him.

Q. Answer whether you know him or not.—A. Yes, sir.

Q. Is he a relative of yours?—A. He is my father, I think.

By Mr. McMILLIN:

Q. How long were you sick after you left there?—A. I have been sick ever since.

Q. Not been able for work since?—A. Oh, I have been able to work since, and have worked since, but then I have been more or less affected with dyspepsia ever since I left there, and I can't retain anything on my stomach.

Q. Where did you work next after that?—A. I worked for Jim Hughes, I think, on Rhode Island avenue.

Q. How long?—A. I worked there some two or three weeks, and was sick all the time, and had to quit work then; afterwards I was foreman for Jerry Bitting.

Q. How long were you foreman for him?—A. About two or three months, I think.

Q. Did you seek work on the tunnel at any time after you left there?—A. I made application once for an inspector. I never laid any brick on there since; that was a verbal application, no written application.

Q. To whom did you make that application?—A. I don't know who it was; he was one of the parties who had charge of it; I don't know whether it was Lydecker, but it was one of them.

Q. Who appointed you inspector in the first instance?—A. The first I knew anything about it was Mr. Coryell.

Q. To whom did you apply?—A. I didn't make any application at all; father made application to Coryell, and I was told it was all right.

Q. What was your father then doing?—A. He was then inspector at Howard University shaft.

Q. And he asked that you be taken from the working force?—A. No; I had quit there on account of being sick there in the first place.

Q. How long had you been at work for the contractors when you became inspector?—A. I worked there in the winter and quit in the spring.

Q. You came off the next spring?—A. I don't know the exact time, but it was in the spring some time.

Q. What did you get as inspector?—A. Seventy-five dollars a month.

Q. These places where you say there was 8 or 10 or 15 feet of space between the masonry and the outside of the tunnel excavation, were they all filled in with stone?—A. So far as I know they were; while I was there they were.

Q. While you were inspector?—A. When I went on top I had to inspect the brick also, and to inspect every batch of cement that was made; you know a man can't be on top and down below too at the same time; that is impossible.

Q. About what portion of your time was spent at the actual brick-work?—A. I couldn't tell that, because I was backwards and forward all the time; I spent ten hours a day backwards and forward, from the bottom of the tunnel to the top of the shaft. Just as soon as the cement would come I would have to inspect it, and if it wasn't fit to use I would have to return it. As soon as the cement arrived I would have to take a sample out of either the bags or barrels that it came in, and if it wasn't fit to use I would have to condemn it. If a load of brick came that wasn't satisfactory I would also have to condemn those brick, and the contractors would say to me when they came that I musn't let them be dumped, because then they would have to be handled twice, and I got all the brick-makers down on me for condemning their brick. It was hard to tell how much time there would be between down below and up above.

Q. You say after you had declined to remain and inspect the night-work you were ordered by those in charge of the work to take charge as inspector, and that then you continued on three or four occasions. Who inspected after you ceased to inspect the night-work?—A. There wasn't any inspector at all.

Q. They went on at work without inspection?—A. Yes, sir; I refused to be there at night-time any longer, though I would occasionally have to put in a few hours to let them key up. Then they got orders from the office, and gave me the order, that I must stay there whether I would or not. So after I got the orders I staid there at night-time for three or four nights.

Q. And then you did not stay, and they went on without inspection?—A. Yes, sir, without inspection.

Q. How long did they go on without inspection?—A. I couldn't tell.

Q. I do not mean the number of hours any night, but what length of time in tunnel work was it that they had no inspection at night?—A. I couldn't tell now.

Q. State approximately.—A. I couldn't approximate it at all. It has been nearly four years since I was there, and I couldn't tell how long they were.

Q. Was it several weeks?—A. They worked considerable at night-time; I haven't got the time or recollection of what they did do at night

Q. But you have an impression that they worked on considerably at night after that?—A. Considerably at night after my inspection and after I had ceased to go at night.

Q. And as to that part of the work of course you can not give any impression except what you saw when you went back in the morning?—A. That is all I could tell when I went back.

Q. Did you ever see them making bulkheads to hide the bad work?—A. No, sir. The next time I was away from there was the time a man fell in a shaft and got killed, and I went to his people to tell them about it; that was the next time, I suppose, I was away from there at all.

Q. During the day?—A. During the day.

Q. What time did the bricklayers begin work in the morning?—A. At 7 o'clock.

Q. What time did you come there as inspector?—A. Seven o'clock in the morning.

Q. And then you quit as inspector at what time in the evening?—A. Six o'clock.

Q. What time were you off at noon?—A. Just long enough to eat my lunch. The hands came up to the top to eat their lunch, and then we all went down at the same time.

Q. I believe you stated that you do not remember how much of the tunnel was lined during this period that you were inspector there?—A. No; I don't know how much of it was lined; I disremember; I couldn't think. I used to have it all in my head at one time.

Q. Who were the bricklayers under you there?—A. The first bricklayer started in there, I can't think of his name; he worked there only one day and didn't suit me and I had him discharged.

Q. For what did you discharge him?—A. For bad work.

Q. What was the nature of his bad work?—A. He didn't lay his brick right; I can't think of his name.

Q. Then who were the others?—A. Then I discharged—I can't think of the party's name.

Q. What was the second man discharged for?—A. Bad work. The third man was a tunnel man; I didn't know him, and never saw him before; I discharged him for bad work.

Q. What was the nature of his bad work?—A. Laying his brick bad.

Q. Was it want of care in laying them or laying them out of alignment?—A. Laying them out of line.

Q. He was not a skilled workman?—A. He was not a good bricklayer.

Q. Were your men employed there generally expert brick-layers?—A. Yes, sir; they were all good mechanics mostly. I often had to take the trowel and show them how I wanted the brick laid. Frequently men would come in the tunnel that were good mechanics, but they didn't exactly understand that kind of work.

Q. After you ceased to remain at night, and they went on with the work at night, when you would come back in the morning about how much linear space would you find they had finished up during the night?—A. I would find that it looked to be all right.

Q. I say, how far would they progress during the night?—A. They had very little work at night; they worked there very few nights; there was no night gang at all. These men worked a couple of hours extra for extra pay; they didn't work both a night gang and day gang at all.

Q. Did the employers, while you were there as inspector, inaugurate the system of paying the inspector for his extra hours?—A. They have never paid me yet, nor the Government either.

Q. Who was time-keeper when you were there?—A. A man by the name of Haller; I think it was John Haller; a little short fellow.

Q. Did he do brick work?—A. No, sir; he was time-keeper.

Q. For that work alone, or for other shafts as well?—A. He was entire time-keeper on the whole line; Arthur W. Leroy was pay-master.

Q. For the whole line?—A. For the whole line; that is, while I was there.

Q. How long was your father inspector?—A. I don't know how long; he was inspector when I first went to journey-work on Howard University shaft.

Q. And continued after you left?—A. And continued after I left.

Q. Where you were at work had the tunnel been kept in a straight line, or did these zigzags that have been spoken of, in some parts of the work, characterize it?—A. Where I was at work it was all zigzag; it looked like a snake crawling.

Q. And the inside space of the brick-work after they finished, showed these curves in the tunnel; did they?—A. It shows them if you take a light and look at them.

Q. You say it is zigzag, like a snake crawling?—A. Just like a snake crawling.

Q. How extensive were those zigzags?—A. I couldn't hardly say; from the start it was a kind of winding around one way and the other, and sometimes there would be a space on this side and then on that. That was the worst feature there, to try to get it straight.

Q. Trying to remedy with brick-work, so far as you could the defects in the tunnel?—A. Yes, sir; sometimes we would have 6 or 7 feet on this side, and on that side there would be none; and next time it would be just the reverse.

Q. And to a certain extent it would have to be left in just that fix by the brick-work?—A. Certainly.

Q. You say those places are frequent in the tunnel?—A. Oh, my, I should say so; as bad as going around Capitol Hill on the cars, pretty near.

Q. I understand you that the tunnel itself you were not able to keep straight, even with the brick-work, by reason of these curves in the tunnel?—A. Most undoubtedly; you couldn't build a straight tunnel through a zigzag hole.

By the CHAIRMAN:

Q. Are you in Government employ now?—A. No, sir.

TESTIMONY OF DENNIS WRENN.

WEDNESDAY, *December* 5, 1888.

DENNIS WRENN sworn and examined.

By the CHAIRMAN:

Q. What is your age?—A. My age is about thirty-five.

Q. What is your occupation?—A. Laborer, sir.

Q. Did you ever do any work in the Washington Aqueduct tunnel?—A. Yes, sir.

Q. When did you begin there?—A. It has been over three years ago.

Q. For whom were you working?—A. Emery & Brennan.

Q. What were you doing?—A. Packing stone.

Q. Outside of the mason-work lining of the tunnel, and between that and the rock?—A. Yes, sir.

Q. Whom did you have working with you as packer?—A. Sometimes one of the men would help me, and sometimes some of the rest of the men around there when I would have any heavy packing to do.

Q. Where did you first do packing?—A. At Howard University.

Q. How long did you remain at that shaft?—A. I worked there over a year when they would be working there; in the winter-time, when the money would run out, they would shut work down.

Q. What kind of packing did you put in?—A. Dry packing when I first went down.

Q. About what length of the tunnel did you pack there at the Howard shaft?—A. I couldn't exactly tell you, sir.

Q. How large were the stones you put in?—A. Some were right large, that a man could lift, and then small ones.

Q. Some were as big as a man could lift?—A. Yes, sir.

Q. And then small ones?—A. Yes, sir.

Q. In that dry packing did you leave any places that were not filled?—A. No, sir; not when I first went down to work.

Q. But did you afterward?—A. Yes, sir.

Q. I am now speaking of dry packing.—A. Yes, sir; I know what you mean.

Q. Where did you leave unfilled spaces when you were putting in the dry packing?—A. Some at Howard University.

Q. How did you come to leave those?—A. Some places between the timbers that we couldn't get at because there were so many timbers overhead.

Q. In the places where there were no timbers did you leave any vacant spaces?—A. No, sir; not in the dry packing.

Q. In that dry packing work, except where the timbers were such that you could not do it, you say you filled full, did you?—A. Yes, sir; I did.

Q. Were there not some places where you could not get into the hole far enough to actually pack the stones in tightly?—A. Yes, sir; we couldn't do that in some places because the timbers would come that close together that we couldn't get in there, but then we would shove in as many as we could with a stick or something.

Q. But were there not some places where you could not reach in to actually pack the stones, and where you had to toss or roll them in?—A. No, sir; not in Howard University.

Q. After you had done work at dry packing at Howard University where did you go next?—A. To Champlain avenue.

Q. What year was that?—A. It was about two years ago, I believe, Senator, or maybe more.

Q. Did you go right from Howard University shaft to Champlain avenue shaft?—A. Yes, sir.

Q. It appears from the time-book that you began at Champlain avenue in the week ending October 9, 1885; next week you worked there a little, and so on through October. Did you go back from Champlain avenue shaft to Howard University shaft?—A. Yes, sir.

Q. Did you work any in Champlain avenue shaft after you went back to Howard University shaft; did you go back to Champlain avenue again?—A. No, sir; they were just finishing up, the time before this last time that they commenced, Senator.

Q. What kind of packing did you do at Champlain avenue; rubble masonry or dry packing?—A. All cement work, Senator.

Q. Under whose orders were you there?—A. Mr. Lucas was inspector there.

Q. Who employed you?—A. Mr. Emery.

Q. Did you leave any spaces in that cement packing that were not filled up solidly?—A. Yes, sir.

Q. How did you come to do that?—A. The inspectors used to give us leave to do so.

Q. What did Mr. Emery say about it?—A. Mr. Emery, I believe, didn't know nothing about it; he used not to be there; he used to be on top of the arch; that was at Champlain avenue.

Q. What inspector gave you leave to do that?—A. Mr. Lucas.

Q. Which Lucas?—A. The old man.

Q. Thomas?—A. Yes, sir.

Q. Did he tell you not to put it in, or did you ask him if you might leave it out?—A. No, sir; when I first went on Howard University they were doing the work right under Mr. Harper, and he said, "You needn't take so much trouble about that; put them in any way," he says. That was Mr. Lucas said that.

Q. You say Brennan did not know anything about it?—A. He did not.

Q. Not Emery?—A. I don't think he did; not to my knowledge. I don't know nothing about between him and Lucas.

Q. How did you manage when the engineer came in?—A. Mr. Lucas would tell us when the engineer would be coming down there, and the work would be all up solid when they got there.

Q. Who were the masons laying brick-work there when you were doing this false packing?—A. The Kendall boys.

Q. Who kept the time?—A. Mr. Miller, Mr. Quackenbush's time-keeper.

Q. Did you work at any time where Lucas kept the time?—A. Not that I know of. The time-keeper used to come over twice a day and take the time down.

Q. How large spaces did you leave along that were not filled up?—A. Some places 4 and 5 feet.

Q. And how long a space do you think you left at any one place?—A. About three and four and five places.

Q. And how high would it be from the top of the brick-work to the roof?—A. About 3 or 4 feet in some places, more or less.

Q. How far down on the side of the brick-work from the top would those vacant places come that were not filled?—A. All the side walls were done good, Senator.

Q. You did the work on the side walls well?—A. Yes, sir.

Q. How often did you leave such places that were not filled?—A. Some weeks Mr. Lucas would make us do the work good, but more weeks he wouldn't care how it was done.

Q. When Lucas would tell you to do the work good in some of those weeks, what would he say about it? Why would he want it good one week and bad another?—A. I don't know about that, Senator. He would make us do it good; he would make us do it good, so that there wouldn't be a hole that you could put your hat in; and other times he would leave holes as high as this ceiling.

Q. How did you know when Mr. Kirlin was coming?—A. We used to know the time; Lucas would tell us. We would have the stones pointed up on top of the arches until he would pass, and then build a wall in front.

Q. How would you know when Kirlin was coming?—A. We used to know the time of day he would come, Senator.

Q. You said Lucas told you sometimes when Kirlin was coming?—A. Yes, sir.

Q. How would Lucas know?—A. He used to get down about 9 or 10 o'clock in the morning regularly, and along about 3 or 4 in the evening.

Q. And whenever Kirlin was coming along Lucas would tell you, and you would then build up the thing so that it would look all right?—A. Yes, sir; or Lucas would tell us when he would be coming along the track, if that would be high up where we couldn't see, and he would look and tell us it was all right.

Q. Did you work in any other shaft except Champlain Avenue and Howard?—A. Yes, sir; we worked at Rock Creek for about a couple of weeks.

Q. Who was your inspector there?—A. I don't know his name, Senator; one of them was an old man.

Q. It was not Lucas?—A. No, sir.

Q. Was it O'Brien?—A. No, sir; O'Brien was not there then.

Q. Was it McNamara?—A. No, sir.

Q. Was it Masters?—A. Yes, sir; he was there.

Q. What kind of work did you do at Rock Creek during the two weeks while you were there?—A. It was done well, Senator.

Q. But you only worked there about two weeks?—A. That was all, Senator.

Q. And about how many feet in length did the masons lay in two weeks?—A. About 50, more or less.

Q. You say that 50 feet was well packed?—A. Yes, sir.

Q. And that was with cement and stone?—A. Yes, sir.

Q. What they call rubble masonry, I believe?—A. Yes, sir.

Q. Did you work at any other shaft?—A. No, sir.

Q. Did Lucas or anybody else ever give you anything besides your regular wages?—A. Never a cent, sir; I used to pay a quarter for a lamp that I would take down the hole if I happened to lose one; they never gave me any such thing.

Q. Did you not know that it was wrong to leave those holes there, even if Lucas did tell you to?—A. Yes, sir; of course I did.

Q. Why did you not tell Mr. Kirlin?—A. It wouldn't do to be blowing on the man that hired me, I guess.

Q. Why did you not tell Mr. Emery?—A. I didn't tell him; he might know it himself; I guess he did; and Mr. Emery came and saw him and told him in Howard University not to leave any arch without putting in 3 or 4 feet of stone; not to leave any vacant; it was too dangerous.

Q. Did Emery ever come down at the Champlain avenue shaft while you were working there?—A. Yes, sir; many a time.

Q. Did he see you leaving these stones?—A. No, sir.

Q. Why did he not?—A. He wouldn't be on top of the arch; he would be down the scaffold.

Q. So he did not come up to see how you were working?—A. No, sir; sometimes he would come up and key a bay or two in order to have us pack it, but he wouldn't key more than half a bay; he wouldn't leave any bad work up there.

Q. What makes you think that Emery knew that you were leaving those spaces?—A. I don't know; I guess he could judge of a man's work. One man couldn't do all the work that was to be done there if it was to be done right.

Q. I think you mean to say that anybody would know that you, as a packer, could not fill in the amount that appeared to be done?—A. Yes, sir; it couldn't be done.

Q. Did you ever see any bad mortar used for the mason work?—A. Yes, sir; at Howard University Mr. Chadwell wouldn't let them put too much sand in the mortar. He was the best inspector on the line. His work was done solid.

Q. What length of work was done at the Champlain avenue shaft while you were there?—A. Bad work?

Q. No, what length was put in altogether at the Champlain avenue shaft while that work was going on?—A. I don't know; I couldn't tell you.

Q. How long were you at work altogether at Champlain avenue shaft, do you think?—A. I think it was about twelve months, more or less.

Q. In that twelve months they must have got in a pretty long stretch of it, I suppose?—A. Yes, sir; they did.

Q. Was Lucas inspector all the time?—A. Yes, sir.

Q. How soon after you went to Champlain avenue shaft and began to pack there was it that Lucas told you you need not fill it all up?—A. It was the same day I commenced there, Senator.

Q. Who was the packer that was there before you at Champlain avenue? Do you know?—A. No, sir; I don't know; I believe he was a colored man.

Q. Did you do all the packing that was done at Champlain avenue shaft during the time you were there?—A. No, sir. When Lucas would make us do it right there would be two or three men at work there.

Q. When you would be doing good work you had two or three men?—A. Yes, sir.

Q. And when you were doing this bad work did you have anybody but yourself?—A. No, sir.

By Mr. McMILLIN:

Q. How was the brick-work done there during that time?—A. The brick-work was done good, I believe.

TESTIMONY OF THOMAS LUCAS.

THURSDAY, *December* 6, 1888.

THOMAS LUCAS, sworn and examined.

By the CHAIRMAN:

Q. What is your age?—A. Sixty-three next birthday.

Q. What is your occupation?—A. My last occupation was inspector of the tunnel.

Q. What trade, if any, were you brought up to?—A. I learned the trade of stone-mason and brick-mason, without having served any regular apprenticeship.

Q. Have you worked at that business most of your life since you were grown up?—A. No, sir; I never worked at it after I was twenty-one and became married until I got to contracting, and then I occasionally done my own work.

Q. So that your business, during the principal part of your last twenty years, has been contracting and jobbing?—A. Yes, sir.

Q. Did you have any connection with the Washington Aqueduct tunnel at any time?—A. I was appointed in 1884 as inspector.

Q. Who appointed you?—A. Captain Symons.

Q. How did you get your appointment?—A. I had been foreman of laying the 48-inch main from L street to what is known as College and Four-and-a-half street.

Q. How long had you been foreman there?—A. From the beginning of the work until it was completed.

Q. And how long a period of time was that?—A. I hardly think it was over two months; it might have been more.

Q. How did you come to be selected as foreman?—A. There was an underground gate-house to be built, to be made of concrete, and they saw that I was competent to do it properly, and Captain Symons selected me in the fall of 1884 to take charge of the east shaft, which was known as Howard University.

Q. Yes, but I am asking you how you came to be employed by Captain Symons as foreman in laying the main?—A. I made application to Kirlin, who apparently was in charge of the work, and I presume they made some inquiry in regard to my qualifications, and they found when I went to work that I was suitable for the occasion.

Q. Did you bring any testimonials to Symons or Kirlin when your appointment was made?—A. I think there were some references; that was about all.

Q. Do you remember from whom?—A. I do not.

Q. Then from the main you went to be inspector?—A. After I finished the gate-house first.

Q. And that was in the fall of 1884, was it?—A. Yes; I think it was.

Q. Where did you first go to work as inspector?—A. At the east shaft, Howard University.

Q. How far had the tunnel proceeded from the bottom of the shaft, then?—A. I don't think it had proceeded more than 5,000 or 6,000 feet.

Q. What was your duty as inspector?—A. To see the work properly done.

Q. What was the work that you were to see was properly done?—A. The lining of the shaft.

Q. Anything else?—A. After they got to bad ground, as we term it, was required to go down and and set the profile that they might begin turning the arch to prevent the falling of rock from overhead and the filling of the tunnel.

Q. Who were the people doing that lining work when you first went there?—A. There was no one doing any lining work when I first went there.

Q. How soon did that begin?—A. I don't think there was more than 60 feet of the shaft made before the lining began on the inside.

Q. I mean how soon in point of time after you got there did they begin the lining?—A. I couldn't tell you.

Q. What were you doing before the lining began, then?—A. First, I had to see that the work was taken out sufficiently to receive the shaft; it taken some time before I would allow the footings in, because there was great weight, and they had to be made substantial, and consequently I took a good deal of time.

Q. That was the shaft itself?—A. That was the shaft itself.

Q. About what time of the year did the first lining that you saw done occur?—A. I think it must have been in the spring.

Q. That was the East shaft?—A. East shaft. I am not sure as to the time; I think it must have been in the spring; it might have been late in the winter of 1885.

Q. Do you mean late in the year 1884?—A. It may have been early in the beginning of the year 1885 or late in the winter of 1884.

Q. From the time-book at Howard University it appears that the work there began the week ending March 6, 1885. Tell us who were the masons at the shaft where you began inspecting the lining.—A. My son, who was before you yesterday, was one.

Q. What was his name?—A. Lorenzo.

Q. Who else?—A. Mr. Imaly. I think it must have been earlier than the first week in March that we began work there.

Q. That is the first that appears here in the time-book, and you describe the same persons that are named on the book.—A. I know I was sick when Captain Symons came to the house and wanted me to take charge of the work.

Q. Was Emery at work there at all?—A. Yes, sir; he worked on the shaft.

Q. Did he work on the lining?—A. He worked on the shaft and on the lining of the tunnel also.

Q. How long did you continue as inspector at this shaft, whether you call it East shaft or Howard University shaft, where your son, and Imaly, and Emery were working as masons?

The WITNESS. Do you want to know when it was we finished the contract?

Q. Were you working east or west?—A. I was working on the shaft itself.

Q. I am talking about the lining of the tunnel.—A. I never began the lining until I relieved my son, which I think was in August or July, 1885, at Champlain avenue.

Q. What were you doing at the Howard University shaft, where you say your son, Imaly, and the others were at work?—A. I remained there until I completed the shaft.

Q. Did you remain there until you completed it?—A. Yes, sir; and I had to go frequently to see how the work was progressing.

Q. Had any lining been done while you were at the bottom of Howard University shaft or in the tunnel running west from that shaft?—A. They were in the lining, but I went in to see it occasionally.

Q. Who was the inspector?—A. I forget whether it was a young man named Hutton or not; Chadwell superseded him.

Q. Where did you go from Howard University shaft, where you now say you did not do any inspecting of the lining at all; where did you go to work next?—A. I didn't go to work next until I relieved my son, when he was taken sick.

Q. When did you begin?—A. I won't be sure whether it was in the middle of July or near the first of August; but if I am not mistaken it was about the 17th of August that I got through.

Q. Got through where?—A. Got through with Champlain avenue. There was some other work done, after I got through, by a man named Harper, patching up some bad ground; patching up the bad ground appeared to be the principal object of the lining.

Q. That was August, 1885?—A. I think so.

Q. It appears from the list in the Aqueduct office that you were first employed as inspector from November, 1884, to May, 1885, and then from August, 1885, six months and five days?—A. No, sir; that is not right.

Q. That is not true.—A. No, sir; I took my son's place at Champlain avenue and remained until the appropriation was exhausted.

Q. Your son, according to the record in the engineer's office, was

employed from March to July, 1885, four months and ten days, and the same paper shows that you began in August, which corresponds with your statement that you succeeded your son?—A. Yes, sir; so I did.

Q. That was at Champlain-avenue shaft, whatever the time was?—A. Yes, sir.

Q. Then we will start there. What time do you think it was that you started at Champlain-avenue shaft?—A. I think it was in the latter part of July or the first of August.

Q. Which heading of Champlain-avenue shaft were you at work in?—A. West.

Q. When you began there, whatever time it was, how far west from the shaft itself had the lining been carried?—A. I couldn't tell you.

Q. Do you know the number of the stations where you were at work as inspector?—A. I could only tell if I had the cross-sections; I could tell by the cross-sections that I made.

Q. Did you make weekly reports?—A. I never made any reports at all except to make cross-sections and submit them.

Q. Who were the masons at work when you began to inspect there?—A. Emery and Dorsey.

Q. Was there a man there named Slater, too?—A. Slater was not with me; I don't think so; I don't remember of him being there; he was with me awhile on the shaft at Howard University.

Q. That corresponds with this book exactly. The record book of the office shows that you began the 1st of August, and for the week ending the 7th of August the only two masons there were Emery and Dorsey, and the other man was gone. They were the two, were they?—A. Yes, sir.

Q. Emery was the subcontractor, was he not?—A. I suppose he was; I didn't know it to be the case; I have heard it to be the case.

Q. Did you understand it so at the time?—A. I had understood it, and I never thought otherwise.

Q. My question is whether at the time you were inspecting there you did or did not understand that Emery was a subcontractor?—A. I had heard so, and it was my impression that he was.

Q. You believed it?—A. I did.

Q. You treated him as subcontractor, did you not?—A. I think so.

Q. Who was the person who was the packer?—A. Now I couldn't remember; if I am not mistaken, his name was Harper; I am not sure.

Q. Do you remember a man named George Griffin?—A. Yes, sir; I know George Griffin; I think he mixed the cement.

Q. Do you know a man named Henry Collin?—A. I don't remember him.

Q. Do you remember a man named Patrick Churchman or Peter Churchman?—A. No; the name seems familiar to me, but I couldn't state positively.

Q. Do you remember a man named Brown that worked there at that time—the very first week of your work as inspector?

The WITNESS. In the tunnel?

The CHAIRMAN. Champlain avenue west—the very place you say you worked.

The WITNESS. I can't say that I do.

Q. Do you remember a man named Lindsley?—A. No, sir.

Q. Do you remember a man named Mike Shea?—A. I do.

Q. What was he doing there?—A. I don't remember his working there in that part of the tunnel at all.

Q. Do you remember a man named Joyce?—A. No, sir.

Q. Can you remember the name of any one of the people whose work you were inspecting there, except Emery and Dorsey, whom you have named?—A. I can not, without it was Shea; if Shea worked there I don't remember it; that man worked with me at Howard University.

Q. What was your duty at Champlain avenue west; what were your orders?—A. My orders were to see the work done properly.

Q. What work was it that you were to see done properly?—A. To see the brick-laying done properly and the packing put in properly.

Q. What kind of packing was to be put in?—A. Dry packing; that was in accordance with the specifications at that time, if I am not mistaken, and a different class of work entirely from that I put in the shaft.

Q. State as nearly as you can how far west of Champlain avenue shaft this work was going on when you commenced to inspect there.—A. I couldn't tell you.

Q. Was it 1,000 feet?—A. Oh, no; it wasn't 700 feet.

Q. Do you think it was more than 500 feet?—A. I hardly think it was.

Q. According to the best of your recollection—of course you can not tell exactly—how far do you think it was?—A. It was between 200 and 700 feet.

Q. How long did you stay at Champlain avenue shaft?—A. I couldn't tell you; I never kept any memorandum of my time; the books of the office should show.

Q. While you were on the work that summer, did you work anywhere else than at Champlain avenue, as inspector?—A. No, sir.

Q. Then if the books at the office show that you worked six months and a half, from the 1st of August, 1885, it must have been at Champlain avenue shaft, must it not?—A. I didn't work there until the following appropriation; I think it must have been 1886, the second appropriation.

Q. Never mind about the second appropriation. You say you were there somewhere about the last of July or the first of August, 1885?—A. Yes, sir; I think I am right.

Q. Now we start there. Do you say you did not work there six months and a half?—A. I didn't work there over twenty days when I relieved my son at that time.

Q. Who succeeded you as inspector there?—A. When I came out the appropriation was exhausted. There was a piece of bad ground there called the Crow's Nest. Harper was called from Champlain avenue, where he had been looking after the lining and putting in a stretch of work to protect the tunnel from filling up after I had left. What time he was there I don't know.

Q. All the work you did as inspector that year you did in Champlain avenue west?—A. I think so. If I could only get to know whether I started in the fall after the new contract, I could tell.

Q. We are under the old contract now.—A. I don't think I worked over twenty days from the time I relieved my son until I was relieved for want appropriations.

Q. Did you work for the Government anywhere else that year after you came out of the shaft?—A. No, sir; I might have gone back the same year, under another appropriation, but not under the appropriation for dry packing.

Q. Did you get any pay from the Government for any time you did not work as inspector there?—A. No, sir.

Q. Then, if it should turn out that you were paid for six months as

inspector, you were there, were you not?—A. If I was paid for six months I must have been there, but I couldn't have been paid for six months' work when I wasn't there.

Q. About how much lining was done, do you think, in Champlain avenue west in the summer and fall of 1885, while you were there as inspector?—A. When you come to the fall of 1885 then you strike another contract; then I went back again in the tunnel under the subsequent contract; I couldn't say how long I worked under that contract.

Q. At this moment I do not care which contract it was. You say you only worked about twenty-four days right where you first went into Champlain avenue west?—A. I think so.

Q. And then the appropriation ran out and the work was suspended?—A. Yes, sir.

Q. How soon after that, according to your recollection, did you come back and begin again?—A. I couldn't tell you; my memory is very shallow in that matter. But I know Mr. Kirlin was appointed chief inspector under the second contract, and I went back with him; whenever Kirlin went back I went back.

Q. During the time, whatever time you were there the first time, beginning about the 1st of August, 1885, what kind of packing was put in?—A. In the tunnel it was all dry packing.

Q. Did you see it put in?—A. I didn't see it all put in; no, sir. A man couldn't live in the position he would have to be in in order to see it, on account of the smoke and heat, they were so terrible in those arches; it was worth a man's life to stay there for half an hour.

Q. Was it any harder for you to stay there half an hour than it was for the workmen?—A. I think it was harder, on account of my age. And then I have heard some talk about the laziness of the men being the cause of this bad work there; I think it was the anxiety of the men to get out of the smoke and heat that were so great in the tunnel; I think that was the reason the work was slighted.

Q. Did you think at that time that the work was likely to be slighted on account of the smoke?—A. No, I didn't think of it then; not until lately.

Q. How much packing do you think on that first occasion was absolutely put in by yourself?—A. I don't suppose over 60 or 70 feet. You see we didn't do more than about 6 feet 6 inches a day; hardly that.

Q. How high was the wall of rock above the key of the arch along there?—A. In some places it would work right down to the crown of the arch and at other places it would go up 3 or 4 feet.

Q. While you were working there did you see any bad work?—A. I have had some of it torn out and replaced.

Q. At what place was that?—A. Not under the first contract.

Q. I am talking about the first contract, where you did, as you say, about twenty days' dry packing.—A. I never saw any work there that I didn't think was sufficient.

Q. Did you see any holes left?—A. I don't think I did, excepting the interstices between the stones.

Q. All that you saw on that occasion was put in solidly and full of dry packing?—A. I think so.

Q. Do you remember what time that was?—A. I couldn't tell you, judge, what time; I couldn't be there all the time.

Q. I am asking you about what you saw when you were there.—A. What I saw was good; at the same time I had to be away part of the time on top, looking after the mixing of the cement and inspecting the tunnel; and while that would be the case a man couldn't be all the

time on the arch to see what was going on there; and if these men wanted an opportunity to do bad work, it was easy for them to do so.

Q. How long a time in each day of that first twenty days were you actually down in the tunnel where the work of building the arch and packing was going on?—A. I should say all of six hours, and then my other time I would be on top looking to see that the bricks and cement were good.

Q. A day's work of the masons and laborers was nine hours, I believe.—A. They worked ten hours.

Q. So that there would be four hours in every day when there would be no inspector there?—A. I would have to be going and coming.

Q. I am on the question as to whether you were actually there.—A. Yes, sir; I am satisfied I was there all of six hours.

Q. That would leave four hours when there was nobody there watching the work?—A. Yes, sir.

Q. Did you report to Mr. Kirlin, or to Captain Symons, or to anybody?—A. Kirlin was not there at that time.

Q. Did you report to anybody during that twenty days that it was impossible for you to do the inspecting down below and at the same time be up above on top inspecting the cement?—A. No, sir.

Q. Why did you not?—A. I didn't think it was necessary; I supposed the men were doing the work right in my absence.

Q. During that twenty days did you see them do any work that was not right?—A. I did not.

Q. Or leave any vacant spaces, or slight any of the work?—A. I did not. There was plenty of time for them to have left those vacant spaces in my absence.

Q. So that whatever was done that ought not to have been done, or omitted to be done that ought to have been done, you did not see?—A. No, sir.

Q. Did you hear of it at the time?—A. I did not.

Q. Did you suspect it?—A. I did not.

Q. After you got done with the dry packing there on that occasion, and went out on account of the exhausting of the appropriation, you went back, you say, under the second contract—the new contract, as you call it—at the same time that Kirlin went in as chief inspector?—A. I went in a day or two after.

Q. The office books show that Kirlin came in as inspector the 1st of November, 1886; that was the next year.—A. That was the time I went in with him.

Q. Now let us see how it appears as to you. The records show that you were subinspector from November, 1886, to September, 1887, and then from May to August, 1888. Does that accord with your recollection?—A. Yes, sir; I think that is right.

Q. When you went in the 1st of November, 1886, under the new contract, what were your duties?—A. As before.

Q. Inspecting the mason-work lining?—A. Yes, sir.

Q. And the packing?—A. Yes, sir; and making cross-sections.

Q. At what place were you first stationed?—A. At Champlain avenue west.

Q. What kind of packing was called for by the specifications at that time?—A. I never saw the specifications.

Q. What kind of packing did you understand was to be put in at that time?—A. I was informed that the work had to be done better than what it had been before, and that more cement must be used.

Q. Yes, but you said the former contract called for dry packing, so that there would be no cement used at all, would there?—A. No.

Q. What do you mean by more cement, then?—A. They were cementing the stone together.

Q. You understood, then, that the packing you began to inspect on the 1st of November, 1886, was to be rubble masonry, did you not?—A. No, sir.

Q. What did you understand it was to be?—A. To be common packing with cement, but not with rubble.

Q. Any stone in it at all?—A. Of course there were stones, but not what we call rubble wall; we couldn't build it; this packing was of a different nature altogether.

Q. What did you understand had to be put in there?—A. Stone, properly laid in cement, but still it was not what we call rubble masonry.

Q. It was stone properly in cement?—A. Yes, sir.

Q. And that stone, properly laid in cement, was to fill up the whole space outside of the brick?—A. That is what I understood.

Q. And your orders were to see that this was done?—A. Yes, sir.

Q. Did you see that that was done?—A. It was always done when I was there.

Q. You never saw bad work done there?—A. I haven't had it torn out.

Q. Did you ever hear of any that you did not have torn out?—A. I don't think I did.

Q. Try to remember as well as you can?—A. I don't remember of any, really; there may have been.

Q. Which way was the work progressing there on the second occasion, November, 1886? Were you working west or working east?—A. We were working west.

Q. Carrying the lining in that direction?—A. Yes, sir.

Q. Did you stay at work in that Champlain avenue west, during the whole time that you were engaged during that year, 1886-'87?—A. I remained there until the appropriation was again exhausted.

Q. That was away in September, 1887, or the end of August, was it not?—A. I think it was.

Q. So that you were there from the 1st of November, 1886, to the 1st of September, 1887; that would be ten months?—A. I think it was about ten months.

Q. About how far did the lining run during that ten months? How far was it carried under your inspection?—A. From the point where Harper left off to the end of the summit that I had to go to, I think it was 1,960 feet; that was from the shaft. From the shaft where Harper left off, if I am not mistaken, was 760 feet, or thereabout.

Q. Taking that out of 1,960 would show?—A. Yes, sir; take that from 1,960, and you will have the amount.

Q. That would be 1,200 feet?—A. Then there was an intervening section that Mr. Tarbell was working on.

Q. Did you inspect that?—A. No, sir; I relieved Mr. Tarbell.

Q. During this same period of time?—A. Yes, sir; that was after I went back the second time with Kirlin.

Q. Was that in the same shaft?—A. Yes, sir.

Q. And west?—A. And west; and between two sections of brickwork.

Q. During that whole time of ten months I want to ask you whether you ever saw any bad work done that you did not cause to be torn out?—A. Yes, sir; I did, and had it torn out.

Q. I say that you did not cause to be torn out.—A. No; I don't think I did.

Q. On how many occasions did you see bad work that you did cause to be torn out?—A. I couldn't tell you the number of occasions; it was very frequent.

Q. How many hours a day were you actually inspecting and putting in masonry and packing during that time?—A. I couldn't give you the exact time. I was required to be there nine hours a day, but there was no one to assist me, and consequently it gave me a great deal to do in running up and down to see that the cement was properly mixed, and so forth.

Q. Was it your duty to see that the cement was properly mixed on the surface?—A. That was part of my duty.

Q. That was part of your duty as subinspector, was it?—A. Yes, sir; there never was inspectors enough in the tunnel to do justice to it.

Q. Did you report to Mr. Kirlin, to Major Lydecker, to Captain Symons, or to Mr. Coryell that you had not force enough for a proper inspection, as you had to be passing out at the top part of the time to inspect the cement?—A. I did not; I thought they had judgment enough to know; and so long as I could do the work I was willing to do it, and I didn't propose to make any complaints whatever.

Q. The cement was mixed dry on the outside, and brought down dry, and wet up below?—A. Yes, sir.

Q. Why was it necessary for you to be on top to see this dry mixing done; you could see to it just as well below, could you not?—A. You could see it properly done when you were on top.

Q. You could see it done properly, whether it was good or bad, could you not?—A. Often we had to send for additional bags of cement to make it sufficient to work with.

Q. That was after you had inspected it on top?—A. No, sir; it was when I didn't inspect it on top.

Q. Then some of the time you did not inspect it on top?—A. Yes, sir; not some of the time, but the greater portion of the time. If a man has to go 1,900 or 2,000 feet under ground and then 150 feet in a shaft, and perhaps have to wait fifteen or twenty minutes before he can get an opportunity to go up, that all takes time.

Q. Do you remember the numbers of the stations along there where this 1,200 feet was built?—A. No, sir.

Q. Do you remember the numbers of any of them?—A. I do not You will find my name wherever the cross-sections are, if you have the cross-sections. When I left the shaft Kirlin got my books that I had.

Q. How did those stations commence? Where would be Station No. 1?—A. I couldn't tell you; I never saw any marked in that way.

Q. What I call stations are every 100 feet, in the engineer's language.—A. Station No. 1 would be 100 feet from the shaft.

Q. Going west?—A. Going west.

Q. And when you began there——A. I didn't begin there.

Q. I know; but you began at Champlain avenue west, in 1886. I do not mean station No. 1; but when did you begin on the 1st of November; about how far west from the shaft itself was the work begun?

The WITNESS. That was November, 1886?

The CHAIRMAN. Yes. I think you said that Harper had gone in about 760 feet.

The WITNESS. Yes; I think it was about 700 feet from the shaft.

Q. And then you went on about 1,200 feet more?—A. I went to 1,060 from the shaft, and I had a piece put in between those points where

Harper had got this bad ground and the place where the Crow's Nest was and the section where I left off before; if I am not mistaken I had to put in two sections intervening.

Q. How far west from the shaft do you think this Crow's Nest was?—A. I think between 750 and 700.

Q. Just about the end of Harper's work going west?—A. He covered the place; that is the point they call the Crow's Nest.

Q. Did you begin exactly where Harper left off? Did they go on with the lining from there?—A. We began there; yes, sir.

Q. Generally how high were the spaces along this 1,200 feet that you worked above and around the brick-work?—A. They varied; sometimes they would work right down under the roof, and at other times it would be up as much as ten feet, and I don't know but what more. If I had those cross-sections that I made I could give you the exact height of every point.

Q. What is the length of a center that they put up for building an arch?—A. Fourteen feet.

Q. And that is divided into three bays?—A. Yes, sir; four ribs and three bays.

Q. How long would it take, say, three or four masons to do the lining itself?—A. Well, it would generally take them a day or two to put up the centers, to cover the arch.

Q. Would they build the side-walls too?—A. No, sir; they would build the side-walls one day and the following day they would put up the arch.

Q. And it would take them a whole day or two to put up the whole arch, 15 feet?—A. Yes, sir; and frequently it would take them three or four days to pack an arch where the roof was high.

Q. How many packers were there at work there?—A. We had what was called one packer and he had as many helpers as he wanted.

Q. And with all the helpers that could be used it would take three or four days, ordinarily, for the packer to fill in?—A. Not regularly, no; but I am speaking of some instances. Where the roof would be high it would take a great many stones; we would have to go to work and build steps.

Q. Where it would run from 2 to 6 feet, how long would it take the packers to put in the cement and stone solidly?—A. They ought to pack an arch 6 feet high in two days. While they would be putting the invert in the packers would be packing the arch. They would be packing the arch as the arch went up until we got from the springing line up to the key.

Q. Then the packers could not have packed the length of a center during any of the time that you would be up on top, when you were away for an hour or two?—A. No, sir.

Q. They could not do it in a whole day?—A. Only where the roof was low.

Q. I am talking about where it is from 3 to 6 feet high.—A. No, sir; they couldn't do it in a day.

Q. Did they leave any vacant spaces there?—A. I have every reason now to believe that they did.

Q. At that time did you know anything about it?—A. I didn't think so.

Q. As you saw the length of each center and knew it, and as you saw what the condition of the work was when you were out, could you not tell when you came back whether they had got further than it was possible for the packers to have got to do the work properly?—A. I think I could.

Q. Did you not notice anything of that kind?—A. I have noticed frequently that there would be apparently more work done than ought to have been done in the length of time, and I have spoken about it, and they said, "If you want it torn out you can tear it out yourself."

Q. You noticed that and spoke about it?—A. Yes, sir; and on one occasion I tore it out, and sent away the man who had done that.

Q. When was that?—A. That was in 1886.

Q. Who was the man who was sent out?—A. He was an Irishman; I forget his name; he was a stone-mason from Boston.

Q. But you can not think of his name?—A. No, sir.

Q. Who were the masons at work there?—A. They had various masons.

Q. I mean when you began, in November, 1886.—A. I think the Kendall boys. I don't remember whether they began in 1886 or not.

Q. They worked there the very first week.—A. Then they were on the work. I think they worked there all the time.

Q. Was Emery there?—A. Emery was there, and occasionally he didn't do any work, but looked over the work.

Q. As shown in this book, the first week of resuming work on Champlain avenue he is shown as having been there and as having worked every day that week—five days. It seems that none of them worked on Saturdays, apparently.—A. That might have been the case, but I don't remember it.

Q. Do you remember a man named John Malone?—A. I knew John Malone; he was a trimmer or miner.

Q. He was not the stone-mason that was discharged?—A. No, sir.

Q. You can not think of the name of the man who misconducted himself and was sent out?—A. I really can not.

Q. Who discovered his misconduct?—A. I discovered it several times, and thought he would do better, but finally, when I discovered it on this occasion, I called Kirlin's attention to it, and he was sent out.

Q. What had he done on that occasion?—A. He started to build one of these bulkheads.

Q. Had you caught him in doing that before?—A. Not in building bulkheads, but I caught him doing the work badly.

Q. Was the name of the man who misconducted himself Driscoll?—A. No, sir.

Q. Was it Griffin?—A. No, sir.

Q. Brown?—A. No, sir.

Q. Reagan?—A. He was noted as a packer on the book, I guess, and I presume he was a packer.

Q. There are no packers noted in this first week, apparently.—A. It was not in the early part; it was about half-way from the time I was employed until I got through.

Q. That would be about April, then. I will turn over to April. I will try February, the last month in this book. Was his name Turner?—A. No, sir.

Q. Was his name Dyer?—A. No, sir; Dyer was a bricklayer; he didn't work there that year.

Q. He was there on the 4th of February, it appears from this book. Was it Dennis Wrenn?—A. No, sir; it should have been him, though, properly; he should have gone out really, for he was the man that I had had to watch more than all the men in the tunnel. His name was Mack something.

Q. Was the man's name Smart or Smith?—A. No, sir.

Q. You say this particular packer that was dismissed was a stone-mason, too?—A. Yes, sir; he was a stone-mason, too.

Q. Was his name Kerns?—A. No, sir. At the time I speak of those men were known as packers, not as stone-masons. The man I speak of had a brother that worked at the Rock Creek east shaft, that was a foreman of bricklayers.

Q. Was his name Malone?—A. No, sir.

Q. Dorsey?—A. No, sir; he was a bricklayer.

Q. Was his name Condon?—A. No, sir.

Q. Was his name McCarthy?—A. No, sir.

Q. How long did he work there?—A. I don't think he worked there more than about a month or six weeks.

Q. And you had detected him several times before in bad work?—A. Yes, sir; and got him to pull the work out and do it over again.

By Mr. FAULKNER:

Q. He was not there when Wrenn was there, was he?—A. He was there when Wrenn was there; he had a brother that was foreman of bricklayers, and the brother's name was Barney, but his last name I don't remember.

Q. That was Rock Creek east?—A. Yes, sir.

By the CHAIRMAN:

Q. Was his name Miller?—A. No, sir.

Q. Was his name Byron?—A. No, sir.

Q. Was his name Calliger?—A. No, sir.

Q. Was his name McMaugh?—A. His name was McMaugh.

Mr. FAULKNER. His name is Daniel. March 27th Daniel McMaugh was a packer.

The CHAIRMAN. He began on the 11th of February, and ended about the first of April or the last of March.

The WITNESS. He was not there a great while, I know. He gave me a good deal of trouble, him and Wrenn both.

Q. Why did you not discharge Wrenn if he gave you trouble?—A. I thought he would do better, and he did do better, but there was all the time a jar with him to have him do right.

Q. You say that during all that time you yourself did not see any wrong done, any bad packing, or any place where they left it without packing, that you did not cause to be rectified?—A. I didn't see any place that was left, but I did see some bad packing, but I had never saw the specifications, and I presumed the specifications I had seen calling for dry packing was sufficient.

Q. But you told us before that when you went in under this second contract, Champlain avenue west, in the fall of 1886, you knew that under the second contract the packing was to be all of solid cement and stone?—A. Yes, sir.

Q. Filling up the whole space solidly?—A. Yes, sir; but there were places you couldn't get anything in. I say I did understand that that was the contract.

Q. Then if you understood that, wherever you saw that was not done you knew that it was not according to the order that you had received?—A. That is very true; that is very true.

Q. Did you ever report to Mr. Kirlin anything about these things except the time you have mentioned, when McMaugh was dismissed?—A. I had told him that I had to have work pulled out and done over again, but never thought it of sufficient importance to send a man out, thinking he would always do better.

Q. Supposing that right in the work you were inspecting you should go there to-day and find a space of 100 feet continuous that was all empty above the crown of the arch, and merely stopped up at distances of from 10 to 20 feet, as the case might be, with bulkheads, and all the rest of it vacant.

The WITNESS. In what distance?

The CHAIRMAN. In a distance of 100 feet.

The WITNESS. Where does this occur?

Q. (Exhibiting to witness a blue print marked J. M. Wilson, December 6th, 1888, G. F. E.) I say, supposing you went there and found in the very work you superintended a continuous distance of 100 feet altogether built up just like that, that crooked line representing the rock top, and this other line representing the general average height of the entire vacant space of 100 feet in length, and stopped up with these partitions which are shown, what would you think?—A. I couldn't believe such a thing could be so on the work where I was; that it couldn't possibly be so. I would like to know what section of the tunnel that is in.

Q. You have already described as well as you could the distance west from the shaft, and how the sections were numbered?—A. Yes, sir.

Q. This runs from station 9 to station 10, and from station 10 to 10 plus 80.

The WITNESS. West?

The CHAIRMAN. West.

The WITNESS. That could hardly be possible.

Q. Supposing it to be there, and supposing it to be in the work that you inspected, how could it possibly be and you not have known it?—A. That could not have been done without me knowing it—such a representation as that. That shows an arch that has nothing on it whatever except the bulkheads, and that is not the case; it is not the case.

Q. What do you think is in there between these stations that we have marked; that, from your description, is evidently within the space which you inspected?—A. Yes, sir; this very article that you have shown me here comes in the line of the Crow's Nest, and that arch is well packed, in my opinion, or it was then, and the stone certainly couldn't get away; but we couldn't pack above the timber.

Q. We know all about the Crow's Nest; but you said the Crow's Nest was about 700 feet west?—A. This is a continuance of that high ground.

Q. Seven hundred and sixty feet you said was left off?—A. I think so.

Q. I think you are right about it. Now, that begins 140 feet west of the Crow's Nest, if you are right as to where the Crow's Nest is. It begins at station No. 9 west.—A. I know that 900 must come somewhere in the vicinity of the Crow's Nest,

Q. It is in the vicinity, but it is 140 feet west of it, according to your previous statement.—A. I haven't got any data to go by to guaranty me the location of the Crow's Nest, but I should say that anywhere between 700 and 1,900, if this falls in with the work that was done; but it can not be possible that this is right.

Q. Do you think, on looking at that blue print or drawing, as you are familiar with the tunnel business, that you can see any place there that represents the Crow's Nest? There is the line of rock of the roof. Do you think the Crow's Nest is embraced within that distance? Tell us where you think it is on that map.

The WITNESS. You say it begins at 9?

The CHAIRMAN. It begins at 9.

The WITNESS. Then it would be east of that, but it would take a portion——

Q. It begins here [pointing], and that is going west. There is station 9, and there is station 10, and there is station 10 plus 80 [pointing]. Do you think the outline of the Crow's Nest appears anywhere on that paper?—A. I couldn't say.

Q. You can say whether you think it is so. You are familiar with that kind of business.—A. The changing of the running from west to east instead of running from east to west I can't understand.

Q. We are not running from west to east; that is the east end, and we are running west. There is 900 feet west from Champlain avenue shaft, and there is 1,000 west, and there is 1,080 feet west.—A. I think the Crow's Nest would come along here probably [pointing].

Q. The Crow's Nest is a place where there was a dome-like cavity above that was filled in, as you understood, before you went there, with timber and stone and cord-wood?—A. Yes, sir; I believe there were 40 cords of wood in there. That is still east of this.

Q. You see that there is no such place on that diagram at all. The Crow's Nest is off here [indicating]?—A. It is east.

Q. Then the Crow's Nest is not within that section?—A. No, sir. A portion of the ground that they term the Crow's Nest would run out perhaps to 9 plus 50.

By Mr. FAULKNER:

Q. But it was a portion still that you inspected?—A. Up to where Harper left off, wherever that was.

Q. In other words, Harper left off before he reached 900 feet west from Champlain avenue shaft?—A. Yes, sir.

Q. So, as that is longer than 900 feet from it, you must have inspected it?—A. I say so, but I don't see how that can possibly be such a representation as I see here. It is not within the knowledge of man to have it as that is, in my opinion, because I was, I thought, overparticular where that ground was so bad, and knowing that the roof was high and the time it would take to do it—we were only doing about 6 feet of finished work in a day—and it was impossible to leave the work in any such condition as is represented here.

By the CHAIRMAN:

Q. It was impossible without the inspector knowing it?—A. He would have had to know it in some way, without they went there at night in the absence of the inspector and took the opportunity to build such a wall, which they frequently worked at night.

Q. Without an inspector at night?—A. Yes, sir; they worked without an inspector at night, as I have worked there overtime at night. They have worked there even at dinner-time, when I would go out for my dinner. I generally took an hour and a half for dinner, and when I came back a large amount of work would be done sometimes, and this may have been done then. But it couldn't possibly have been done without me knowing it.

Q. You have told us that the masons could only make about how many feet in a day?—A. Six feet; 156 feet of finished work in a month under that contract.

Q. There is 180 feet down there, as you see?—A. Yes, sir.

Q. So that would take a month and a third. Was it possible in any forty days for that sort of work to be done as represented there with

out you knowing it?—A. By means of coming in at night and taking the chances at the dinner hour that might be.

Q. But if they did come in at night they could not do more than 6 feet; the masons could not do more in a night than they could in a day?—A. I am speaking of the entire finished work, judge, brick and stone; and the force that was there was sufficient to do in ten working hours an average of 6 feet every day of finished work, and do it in a workman-like manner. And yet I say, according to this, if this is a fact, which I couldn't believe——

Q. I say, assuming that it is substantially true; assuming that it is in that shape in substance, I want to have you tell us (assuming that the masons could do 6 feet of mason-work in one day) how it was possible, even with night-work, to do that without you finding it out the next morning?—A. It would take night-work and all for doing the 6 feet. The brick-work could be advanced a little faster than the stone, and sometimes there had to be a little delay consequently, but they never had to lose the time for it.

Q. When you went back in the morning and would know about how much time it would take to do the packing, how could you fail to know that there must be some sham about it if they had done so much work?—A. They would say to me, "If you want it torn out you must tear it out yourself," and I told them I wasn't there for that purpose.

Q. You say you were in there six hours out of ten of every working day?—A. I think so.

Q. Could they have done that during the time you were there?—A. They might have prepared and got it in such shape that they could have done it in a short time at night during my absence.

Q. Could they have done it while you were there in the day-time?—A. No, sir.

Q. Or during the ten hours of day-time while you happened to be out?—A. They might have got at it this way: If the roof happened to be low at some places——

Q. But the roof is high?—A. I say it is; and that is the reason that I say it is hardly possible that anything of the kind exists.

Q. But, I say, supposing it does exist, how would it be possible that they could do a thing of that kind in the ten hours of day-time without you knowing it?—A. They might have done it at dinner-time, while I was absent.

Q. That would be only an hour.—A. I would be away an hour and a half.

Q. Call it an hour and a half, and how could they have performed their contrivance like that in an hour and a half?—A. Such a thing might be.

Q. When you were out and came back you would know where they left off?—A. Yes, sir.

Q. And if you found out that they had got 15 feet from that place in an hour and a half you would know that there was something wrong?—A. There was no station in the work at all that would show——

Q. I am talking about you knowing, when you went out to dinner, with reference to where the work stood, and then when you came back an hour afterwards, could you not tell how much work, if any, had been done while you were gone?—A. I would see they had been at work during the dinner hour, and could see the men sitting on the invert eating their dinner when I would come back.

Q. Could you not tell whether the wall had got any longer while you had been gone?—A. I could see that it had.

Q. Would you not be suspicious if it had got 10 feet long and had been built up with packing?—A. I told you my suspicions had been aroused more than once, and that I spoke to them about it, and that they would say, "If you want it torn out, tear it out yourself," and that I said that I was not there for that purpose.

Q. But you know that it was impossible to pack faster than you have already described where the space was from 4 to 6 feet high?—A. I did.

Q. And therefore you came back from dinner, after having been gone an hour and a half, or two hours possibly, and you knew where the work was when you went out, and saw where they had it when you came back, you would know to a certainty, according to what you have said, that it could not have been packed properly, would you not?—A. I would; but, judge, I can not think such a thing as this exists.

Q. But if it did exist, how could you possibly have failed to know it?—A. If such a thing as that did exist I would certainly have known something about it; I couldn't help it; but I don't think it did exist.

Q. Did you tell them not to work during your absence during the dinner hour?—A. No, sir; and I didn't direct them not to work at night until I was required to do so.

Q. The men did not work at night without being paid for it, did they?—A. I don't know what they got at night.

Q. When you went back in the morning, could you not tell whether they had been at work down there during the night?—A. Certainly I did. Didn't I know that they were working at night? I was perfectly aware of that.

Q. Did you report to Kirlin that they were working at night?—A. He knew it.

Q. I asked if you reported to Kirlin, after having made an inspection that they were working at night?—A. Of course I did.

Q. What did he say?—A. Finally he said "When you come out of the tunnel they must come out as you do."

Q. How long after you first told him that they were working at night did he say that?—A. I couldn't tell you.

Q. Did he not say it the very first time?—A. No, sir.

Q. And that no work must be done there without inspection?—A. Of course, he had told me that more than once; but, nevertheless, these men would come in there, in violation of orders, and do the work.

Q. Why did you not direct these men not to work at night?—A. I did.

Q. And you think they worked there in spite of your orders?—A. They worked there in spite of everybody.

Q. And when you went back in the morning you would find they had done about how much work?—A. Apparently, a reasonable night's work.

Q. Which would be 6 feet?—A. About; that is, day and night.

Q. And you went back and really found that they had made 20 feet?—A. There was never any of that night-work.

Q. You never saw in the morning what appeared to be more than 6 feet of work that had been done?—A. I don't think I did, except on one occasion, when I found these Kendall boys there.

Q. The 6 feet of work would not answer to these bulk-heads at all because they are farther apart than 6 feet in every instance.—A. I don't think it is that way there. I am satisfied that that representation is wrong; I think so; in my judgment it is. If you had been in there and saw such a thing as that, I would believe it, but not otherwise.

Q. Supposing I should state that I had been down there, and had

walked right along more than 100 feet, just cutting holes through these bulk-heads, as you would cut holes through the partitions of a house, and that that open space was from 4 to 6 feet high; what would you say?

The WITNESS. When was that?

The CHAIRMAN. In that very place.

The WITNESS. I would say, if you told me that you had been there, I would believe it, but I would never believe such a thing until some man who had the honor of yourself would say so.

Q. You would believe it if you went there yourself and saw it, of course?—A. I would be more than glad to accompany you over there and see whether such a thing exists or not.

Q. Suppose you saw what I have described to you, and were told that it was 6 feet high all along there, as that representation shows, would you think it possible that that could happen without you knowing it?—A. I hardly think it could, even with the chances of night-work and at the dinner hours.

Q. Who was keeping the time of the workmen during this period we are now speaking of?—A. They had a time-keeper; sometimes I would keep the time myself so that I would be able to return the time to Kirlin.

Q. When did you begin to keep time?—A. It was only a short time that I was keeping time for him.

Q. You worked there in November, 1886; now when did you begin to keep time?—A. I didn't keep time more than three or four weeks, I don't think.

Q. Who was the time-keeper during the first part of the work?—A. The boss brick-layers.

Q. Who were they, the Kendalls?—A. The Kendall boys kept time there; and Emery himself had kept time; and a man by the name of Terrell also kept time. I couldn't exactly make returns as I would like to Kirlin of the number of men at work, and consequently I could make myself better acquainted by knowing the number myself.

Q. Did you make any written report during that period of your inspections?—A. No, sir; none but the cross-sections that I submitted.

Q. I do not mean that, but I mean an ordinary statement of how much the work would progress, and so forth, at the end of the week?—A. No, sir; I did not.

Q. Did anybody pay you anything for keeping time?—A. I got paid for overtime; Kirlin required that I should be paid for all overtime.

Q. How did Kirlin require it?—A. He first went to the office, as he told me, and asked Lydecker to allow the inspectors to remain longer in the tunnel, eleven hours, and to have their pay increased to $90 a month; and he told me that Lydecker positively refused to let the inspectors remain over nine hours; and he said, "You make your own bargain with the subcontractors, and whatever you get I don't want to know anything about it."

Q. Who said that?—A. Kirlin.

Q. Did he say that Lydecker told him to say that?—A. No, sir.

Q. That was Kirlin's own statement?—A. That was Kirlin's own statement; that was his statement to me, and I suppose to the others.

Q. That you could make your own bargain with the contractors, and what you got he did not wish to know anything about?—A. He did not wish to know anything about what we got after we had made our bargain with the contractors.

Q. Did you make your own bargain with the contractors?—A. It was

in the presence of the subcontractors that he used these expressions, and I did so.

Q. What kind of a bargain did you make?—A. I was to get paid for overtime.

Q. How much a month?—A. Fifty cents an hour.

Q. Did you get any additional pay for keeping the time?—A. I don't think I did.

Q. Do you not know whether you did or not?—A. I know that I did not.

Q. How much in all did the subcontractors, or any of them, pay you?—A. I couldn't tell you; it was very little.

Q. You could not tell?—A. No, sir; I never kept no account of it; it was a very small matter; I didn't suppose it was going to be necessary to keep any account of it.

Q. Do you think it was as much as $5?—A. Oh, yes; it was more than $5.

Q. How much more?—A. I couldn't tell, as I said before; I couldn't tell what I received.

Q. But you think it was more than $5?—A. Of course it was.

Q. Do you think it was more than $25?—A. I suppose $25 would about reach the whole that I received.

Q. Do you not think, on reflection, that you got more than $50?—A. I couldn't tell you anything about it, for I didn't care much about it, and it would have been better if I had never got any, for I threw it away.

Q. I am not on the question as to what it would have been better for you to do with the money; I want to know what the fact was as nearly as you can get at it.—A. I couldn't give you the amount.

Q. Do you not think you got more than $100?—A. Oh, no.

Q. From the subcontractors or some of them?—A. No, sir; I don't think I did.

Q. For some reason or other, or for nothing?—A. I have had some little presents made to me, and a lottery ticket given me, and a pipe made a present of to me.

Q. I am not speaking of your pay for hours of overtime now; I am asking you to tell us as nearly as you can what you think was the total amount of all the money, or anything that represented money or that was worth money, that you got from the subcontractors, or any of them.—A. I couldn't give you any amount at all, any named amount, because it wasn't sufficient, as I thought, to keep any account of, and so I paid very little attention to it.

Q. You would not be willing to hazard an estimate, then?—A. No, sir; I could not.

Q. Suppose I were to ask you whether it was not a thousand dollars what would you say?—A. I would say very quickly, no.

Q. Suppose I should say $500?—A. I would give you the same answer.

Q. Then I will ask you, do you think it would amount to $300?—A. I will give you the same answer.

Q. Two hundred dollars?—A. The same.

Q. One hundred dollars?—A. I hardly think it would.

Q. Twenty-five dollars?—A. I couldn't give any positive answer in a thing of that kind; if I could, I would come straight out and say.

Q. You would not wish to go below $75, do you think?—A. I wouldn't wish to say any number of dollars.

Q. Not even $1,000?—A. No, not even $10,000; I would be puttin

myself in the wrong boat to say that it was any number of dollars, from the fact that I don't know, and I want to say something that I do know.

Q. Whatever money you did get, from whom did you get it?—A. I got it from Emery, excepting once I got a few dollars from Leroy.

Q. How many dollars did you get from Leroy?—A. I don't know; it must have been $6 or $7.

Q. What was that for?—A. For overtime.

Q. How did you come to get that from Leroy?—A. I don't know.

Q. He was not subcontractor, was he?—A. No; he handed it to me.

Q. Is that all the money you ever got from Leroy?—A. That is all I remember; I have received lots of money from Leroy for the men working in the tunnel off at other places, and when he had some place else to go he would leave the envelopes with me and I would give them to the men.

Q. Those were envelopes addressed to each man?—A. Yes, sir.

Q. That was a mere matter of convenience to him?—A. I suppose so.

Q. Did you always give those envelopes to the men?—A. I did; to the men whose names were written on the envelopes.

Q. Did you ever get any such package that was addressed to yourself?—A. No, sir, not but once; and that was under the last contract.

Q. We have not come to the last contract yet; we are on this time from November, 1886, to September, 1887. Did you ever get any money or other thing of value from Emery besides what you have now stated?—A. Emery has paid me out of his own salary, or whatever money he had, for overtime.

Q. That you have stated?—A. Yes, sir.

Q. Did you ever get any other money or valuable thing from him, excepting this 50 cents an hour?—A. I don't think I ever got anything excepting for overtime; I don't know of anything else.

Q. Did you get more than 50 cents an hour for overtime?—A. I don't think I did.

Q. How much overtime did you work there?—A. I couldn't tell you; their books, if you have them, will show it, I suppose.

Q. But you can not say?—A. I couldn't tell you; I kept no account of it except on Saturdays Emery would give me the money, and excepting on this one occasion when Leroy gave me the money.

Q. How large was the largest amount you ever got at once from Emery for anything?—A. I may have got $15 to $20 as a present.

Q. Would that be given to you?—A. He gave it to me out of his own pocket.

Q. Just handed it to you?—A. Yes, sir.

Q. What did he say?—A. He said, "Here is a present for you."

Q. Handed it to you in bills, or was it done up in an envelope?—A. Right out loose.

Q. How many times did that happen?—A. I don't think it ever happened but once; I think not.

Q. Can you think about what time that was?—A. I could not.

Q. Was it while you were working in this Champlain avenue west shaft?—A. I think so.

Q. Can you give the sum that he gave you on that occasion?—A. I don't think there was any fixed sum; I wouldn't undertake to come to an exact amount, from the very fact that I might not be within——

Q. You could not remember?—A. I couldn't remember whether it was more or less than $20, but I think it was about $20.

Q. Did he ever give you any other money except what you have now mentioned, one gift of $20—less or more, you can not tell how much—

and the pay at 50 cents an hour for overtime?—A. I don't think he did.

Q. You can tell, can you not?—A. I don't remember.

Q. Did he ever give you anything else than money?—A. He gave me a lottery ticket.

Q. Did it draw a prize?—A. No, sir.

Q. Did he ever give you anything else?—A. Brennan gave me a pipe. I have got the pipe in my pocket now.

Q. I am speaking of Emery.—A. No, sir.

Q. I want to know whether Emery handed you, or delivered you, or paid you anything else than what you have now mentioned?—A. I don't know of anything; I think not.

Q. Brennan was Emery's partner, was he not?—A. Yes, sir.

Q. You say Brennan gave you a pipe?—A. Yes, sir.

Q. Did he give you anything else?—A. No, sir.

Q. Did he ever hand you any money?—A. No, sir.

Q. Did he ever send you any money in any way?—A. No, sir.

Q. Did Palmer ever give you anything?—A. I think he gave me $3.

Q. But he was not on this contract, was he?—A. No, sir.

Q. Then we will leave Palmer out for the time being. While you were on this work under the second contract, beginning in November, 1886, and coming down to September, 1887, did you receive anything from anybody, whether it was Emery, or Brennan, or Leroy, or Quackenbush, or Beckwith, or anybody else, except what you got from the United States, as your pay as inspector, and which you have already mentioned as having been received from one or another?—A. I think that is right; I think that is all, as I have stated.

Q. Are you sure of it?—A. I am pretty sure of it.

By Mr. FAULKNER:

Q. I would like to ask you whether or not your contract with these contractors did not require them to pay you $25 a month for your services?

The WITNESS. My contract?

Mr. FAULKNER. Yes.

The WITNESS. I had no contract with them.

Q. Did you not state just now that you had a contract by which you were to get 50 cents an hour for overwork?—A. It was no contract.

Q. What was it?—A. It was merely a request that they should pay us overtime; it was no contract at all.

Q. Did you not have a conversation with those men, in which it was fixed that you would be paid 50 cents an hour for overtime?—A. Yes sir.

Q. Is not that a contract?—A. You might term it so.

Q. Did you not have an arrangement with them by which you were to receive $25 a month?—A. No.

Q. You are certain of that?—A. I am certain of that.

Q. And you are satisfied that you did not receive $25 a month?—A. I am sure of that; I am sure I did not.

Q. If their books would show that you did receive $25 a month, would they be correct or not?—A. I don't think so. I don't see how they could, when I never saw it; they would not be correct.

Q. You speak here of those men in the Champlain avenue west shaft working at night; are you certain that during the time you were there those men worked at night in the Champlain avenue west shaft?

The WITNESS. While I was there?

Mr. FAULKNER. Yes; while you were acting as inspector.

The WITNESS. They worked at night; yes, in my absence.

Q. How do you know that?—A. I got it by the report of the work that had been done.

Q. If those men worked at night, would not the books of the contractors show the fact of that night gang working at night?—A. It was turned in as being work done in the day-time.

Q. Why was that done in reference to Champlain avenue shaft when it was not at Rock Creek or Howard University shaft?—A. I don't know; it was Kirlin's request to turn it all in as one day's work.

Q. Why, then, I say, was it that it was not done in the other two shafts, Rock Creek and Howard University?—A. They were working two gangs of men there; that is the reason; they were working there night gang and a day gang.

Q. You do not mean to say that in the Champlain-avenue shaft west they worked one gang both night and day?—A. They worked what was necessary as a gang in the day-time and then they would work those extra hours; I don't mean to say that they worked all nights; I don't want to have it understood that those men were working night and day.

Q. Let us understand. Then how would the accounts of those men be kept?—A. They would be turned in as a number of men working in the day-time so many hours. You must excuse me, please, from the very fact that I am not a book-keeper, and know nothing about it. I give it to you as I can.

Q. If the books of those contractors show that those men only worked five days during the week, and were only paid for five days of ten hours each, would you not come to the conclusion that they only worked that time?—A. I would. It just strikes me how that happened. The number of hours that those men did work extra at night would be made apparently as an increase of men, and be classified in accordance. I should think that would be the only way they could get at it.

Q. How could that be so, unless you would give the names of those men twice, or give fictitious names?—A. That is so. Then I would be wrong even in that.

Q. Then if the books of the contractors show that those men only worked five days, and no extra time was allowed them, you must be mistaken as to their working over ten hours, must you not?—A. I would, but I am not mistaken that they worked over ten hours.

Q. And that would have been returned by the number of days they worked?—A. I don't know how that would be; I only know how they worked; they worked overtime.

By the CHAIRMAN:

Q. After you ended at Champlain avenue west, about the end of August, 1887, when did you begin work again in the tunnel?—A. I think I began about thirty days afterwards in Champlain avenue east.

Q. How far in was the work east at that time?—A. There was no work on the east.

Q. You began right on the shaft?—A. No, sir; a short distance from the shaft, at a place called Malone's Bend; that was the name by which it was called in the tunnel; there was a reverse curve there.

Q. In the rock work?—A. Yes, sir.

Q. How far west was Champlain avenue shaft of that?—A. I think it was within less than 100 feet of the shaft; I am not sure.

Q. You worked there as inspector, I suppose?—A. Yes, sir.

Q. How long did you work there?—A. Until they finished the appropriation.

Q. That would carry it down to the end of August?—A. I don't think it was more than a month.

Q. How much work was done there during that time?—A. I couldn't tell you just how much.

Q. Did they make about 6 feet a day?—A. I think they made a little over 6 feet a day there; there was no invert.

Q. Then there would be about twenty to twenty-five days of work each month?—A. I think so; I am not sure.

Q. That would make about 125 to 150 feet per month?—A. I don't think there was that much. I think when we started on the last contract it was 227 Champlain avenue east, and that was the extreme east end of the work.

Q. And that was in May, 1888, the next spring, was it not?—A. Yes sir.

Q. Who were the masons for this 120 to 125 feet in Champlain avenue east?—A. The Kendalls were there, and the bricklayers, I believe, were pretty much the same as they were before.

Q. The same packer?—A. Yes, sir.

Q. Who was the packer?—A. Wrenn was the packer.

Q. What kind of work in packing was done there?—A. The packing was done there some better than it was done at the far end, because it was near the shaft, and by that time we had been relieved to some extent from the smoke, because of the fact that the headings had come together.

Q. What kind of packing was done?—A. I thought it was done well.

Q. Did you see it done well?—A. No, I couldn't say I saw it all done. They used every possible means they could to deceive me there. They started the arch in the center and worked both ways; and they would have a packer on this end and a packer on that end, and consequently sometimes one man would be taking advantage when I would be out of his sight, and then when I would go to the other end the other man would be taking advantage.

Q. Did you report that to Mr. Kirlin, the engineer, or anybody?—A. I did, and I remember that he said to me, "You have got the greatest up-hill job of any I have seen yet." Then they began to see the necessity of more inspectors.

Q. Did you get another inspector to help you there?—A. No, sir.

Q. Did you see any bad work done there?—A. I found it out in time, and had it corrected.

Q. Did you see any that was not corrected?—A. I don't think I did. Those men appeared to me like they had been instructed to take the advantage; and these men, the Kendalls, I tried to subdue them until they would look at me with scorn, as though they were going to tear me up at any time they could; and this man Wrenn the same way; and the last thing he said when he came was, "God grant we may never meet on another job."

Q. And still you think that packing east was well done?—A. I think it was. There was one point where I caught them doing bad work that I didn't have pulled out, and that was back of the bench-wall; I didn't have that pulled out because if I had I would have had to do it myself, and I didn't report it. I could go there to-day and show it to you.

Q. How extensive was that?—A. I suppose it was a space 20 feet long; but still it was all filled up with rock, solid, though they didn't use any mortar.

Q. You did not report that?—A. I did not.
Q. Is that the only instance you saw of misdoing in Champlain ave-
e east that you did not report?—A. I think so.
Q. Do you not know? You knew that it was an important piece of
ork?—A. I knew that it was an important piece of work, and I was
ving it done in accordance. I thought it was all right; but it was
o big a fight to get it right.
Q. If you should find that it should turn out that that work that was
ne under your inspection in Champlain avenue east was also very
d, with holes and vacant spaces, you would be very much surprised,
ould you not?—A. I would be very much surprised.
Q. Do you think any considerable number of holes and vacant spaces
uld have been left there without you knowing it?—A. I don't think
, without advantage had been taken, as I said before, of the dinner
ur.
Q. Under the last contract, that of this present year, what time did
u begin work as inspector?—A. The 15th of May.
Q. And how long did you continue to be inspector?—A. Until the
h of August.
Q. Where did you commence work as inspector?—A. In Rock Creek
aft.
Q. West or east?—A. East; I think 1,300 east.
Q. How long did you work there east?—A. I was only there a few
ys. I laid the work off, and installed a young man from the reser-
ir, by the name of McNamara; showed him how to do the work, and
en I was sent to Champlain, east.
Q. You showed the young man, McNamara, how to do the work?—
Yes, sir; he had never seen any work of that kind before.
Q. How much work was done there at Rock Creek, east, while you
mained?—A. I think he put up about 100 feet of bench-walls.
Q. Did they put up any arches?—A. They set the centers and began
rning the arch, and I called Kirlin's attention to the class of workmen
at was to do that packing. As I understood the specifications, they
quired skilled mechanics. A man by the name of Martin, who had
en packing about 18 inches of bonded work on the bench-walls, was
ere as packer, and that was supposed to be a different class of work,
d I told Kirlin that that man was not suitable. He says, "Is he a
ason?" I says, "He says he is a mason, and he may be qualified for
at, but it is not according to the specifications." "Well," he says, "so
ng as he is a mason and it don't matter to the union, it don't interest
a bit, and he can have all the helpers he wants." I think it was on
e 18th or 19th of May—I don't remember exactly—that I went to
hamplain avenue and laid the work off there.
Q. Before you leave Rock Creek, did you inspect the work that was
ne at Rock Creek while you were there?—A. I did.
Q. And that you say was almost entirely bench-wall?—A. Yes, sir.
Q. And that was built of stone masonry?—A. Yes, sir.
Q. Did you see the packing of that done?—A. I did.
Q. How was it done?—A. It was done in a workmanlike manner,
ne right.
Q. The spaces were actually filled up?—A. All spaces were filled.
Q. With stone and wet mortar?—A. With stone and wet mortar.
Q. So that when set it would be all solid behind?—A. Solid behind.
Q. Was there any packing done above the bench-wall while you were
ere?—A. Except on the arch from the springing line back to about
teen courses, and that was done properly.

Q. Thoroughly well?—A. Yes, sir.

Q. No big spaces left?—A. I am satisfied there was none.

Q. Did you see anything at that time to find fault with?—A. Not at that time, but I did afterwards.

Q. I mean at that time, when you were at Rock Creek, and before you went to Champlain avenue, east?—A. Everything was all right.

Q. And Martin McNamara succeeded you as inspector at that place?—A. Yes, sir.

Q. You then went to Champlain avenue?—A. Yes, sir.

Q. While you were on Rock Creek on that occasion did you keep time?—A. Yes, sir.

Q. You then went to Champlain avenue, east?—A. Yes, sir.

Q. While you were at Rock Creek on that occasion did you keep time?—A. No, sir.

Q. Did you stay over hours?—A. No, sir.

Q. Did you receive anything, from any of the subcontractors or anybody else, except your regular pay from the Government?—A. Not at that time.

Q. Then you went to Champlain avenue east about when?—A. I think it was about the 18th or 19th of May, 1888.

Q. How far in east from the Champlain avenue shaft was the work when you began there?—A. I think we began connecting on to the work that had been done under a prior contract, I think 227, if I am not mistaken.

Q. Did you see the old work before the new work began?—A. Yes sir.

Q. How did it look?—A. It looked all right.

Q. Did you examine it particularly?—A. No, sir.

Q. Merely glanced at it?—A. In an ordinary way.

Q. Who were the masons at Champlain avenue east on the occasion you are now speaking of?—A. There was Jim Lannigan and—I am so forgetful of names; Lannigan was foreman of the stone-masons.

Q. By the time-book, for the week ending May 18, 1888, Champlain avenue east, there were just two men who were apparently just looking at the thing, doing nothing else. For the week ending May 25, James Lannigan was the foreman.—A. That is right.

Q. And William Lannigan, jr., was a mason; a man named Eden Hart was also a stone-mason, and so was William Lannigan, jr.—A. I don't know that man Hart; I don't think he was ever there.

Q. Who was the packer?—A. This same man Martin who had been brought from Rock Creek.

Q. He is put down here as Lewis Malten; probably that is the same man.—A. That might be the same man.

Q. How long did you continue at Champlain avenue east?—A. Until the 6th of August, excepting to go at intervals to other places to lay off other work.

Q. Was there any other inspector there than yourself?—A. Not in the beginning.

Q. Before you left?—A. Yes, sir.

Q. Who was he?—A. There was this man McNamara came there in the early part of the beginning of that work and superintended the packing over the arch, while I was looking to the bench-walls and having the packing done for sixteen courses, to what we would call the haunches, above the springing line. He was there but a few days, and then we got a young man by the name of Woodward. But whether O'Brien came before Woodward or not I am not sure; I think, though

he did; I think he did, because I worked two nights, three hours each, before Woodward came, and before O'Brien came I had commenced on the third night, when he came to relieve me of the night-work.

Q. Were you and O'Brien on the work at the same time; I do not mean during the same week, but in any one hour or two or three hours together?—A. No, sir.

Q. He is put down here on the book as belonging on the night shift.—A. And me on the day, but I had an assistant with me after he came on, a young man named Woodward.

Q. About how much in length of lining was done while you were there at Champlain avenue east?—A. If I am not mistaken, from 227 to 1,600, with the bench walls, and I think 1,585 with the arch.

Q. That would make 1,300 or 1,400 feet, then, in length?—A. Yes, sir.

Q. In round numbers?—A. Yes, sir; I think it was 1,377.

Q. That would make 1,100 or 1,200 feet?—A. I say I think we did that much work—1,377 feet.

Q. How much of the packing did you see done there?—A. I saw it done up to sixteen courses high on the entire amount of work up to the time I speak of.

Q. Sixteen courses high above the bench wall?—A. Yes, sir; and on some occasions we might get, perhaps, thirty-two courses, if it was narrow.

Q. How many feet would sixteen courses carry it from the bench walls, following around on the outside of the brick?—A. It would carry it up short of 4 feet.

Q. And that would leave above that 4 feet, taking both sides together, how much space for the crown of the arch to be filled in, measuring right around over the top?—A. I measured one place after I began to suspect there was something wrong; I took a stick that I had for cross-sections and I measured from the sixteen courses to the haunch, all the way around, and it was just an average of 4 feet, and the arch was just 2 inches, I think, over 8 feet long; and I made a calculation of 40 yards of work in it. That is the night I told the colored man to drop a brick at the cement-house door for each barrel of cement, and told the man at what we call the summit (which is the bottom of the shaft) also to take an account, and he did so, and their count corresponded the next morning, there being six bricks at the cement-house door, and six loads of cement came down, according to the man's account; and the work appeared finished the next morning. I was very outspoken in regard to that, and Palmer censured me very severely for it. He being Kirlin's intimate friend and being the sub-contractor, I thought it was strange; and when Kirlin came in the tunnel Palmer met Kirlin and told him what I had said, and Kirlin came up and takes me up in the tunnel where I had been preparing to set a profile just before, and told me that I ought not to express myself so openly in the tunnel; that I should have waited until he came and told him, and then it would have been all right.

Q. That was Kirlin who said that?—A. That was Kirlin who said that; he said that to me. And I said to him, "The thing is so glaring that I can't help speaking of it." Then he said, "Whenever another matter of that kind occurs, you come to me and tell me; and what you want to do is to attend to your own work and not give any attention to any other work without it comes directly under your notice." I told him that came under my notice. I had a grandson working there at 50 cents a day at that time, and when that matter came along Palmer said to my grandson, "Genie, I guess we won't want you any longer;"

and the boy went out. I did say to Palmer's foreman that he ought to give the boy more pay, for, although he was only about eleven years old, he would go through the tunnel far quicker than a man could, and he could hand up as many bricks as a man. I had to instruct the men to make them do what was right, and I said that for the valuable services I was rendering him the boy ought to have more pay, and I think so yet.

Q. Valuable services rendered whom?—A. To Palmer, in seeing that the contract was executed according to the specifications.

Q. When you had this colored man at the shaft, who was sending down cement, and the man at the bottom of the shaft keeping an account of the amount of cement that came down, that was for a night when you were not there?—A. Yes, sir.

Q. Who was the night inspector at that time?—A. O'Brien.

Q. How much cement should have come down for the amount of work you saw done?—A. It should have taken 40 barrels.

Q. And, instead of that, only 6 barrels came down?—A. Six came down.

Q. That led you to the conclusion that the packing could not have been put in properly?—A. Yes, sir.

Q. About how many feet in distance had they gone that night?—A. They had gone 28 feet.

Q. What was done about that 28 feet?—A. Nothing; it was left as it was, and it continued in the same way all the way through so long as O'Brien was there. So long as O'Brien was there the work was neglected.

Q. How was this side packing done that was under your own observation during the day?—A. It was done well. We were using from 60 to 70 barrels of cement a day. I undertook to take an account of the amount of cement for Kirlin to submit with his report, so that the engineers, in making up their estimate, would be able to see that the proper quantities went in; I undertook to do that under the former contract, but he would not accept it; consequently the engineers have been ignorant of the amount of cement that has been used all through. Every inspector should have sent them account of the amount of cement, to see the amount of masonry when they made their estimate, and then the engineers would have known just where they stood.

Q. During the time you were there in Champlain avenue east, and were inspecting the packing behind the bench-wall and behind the haunches of the arch up to the height you have mentioned, did you discover any bad work being done at any time?—A. Yes, sir; and the man was sent out.

Q. Who was he?—A. If I am not mistaken his name was Mills.

Q. Was it Mills or Miller?—A. It might have been Miller; it was Mills or Miller.

Q. Here is a man's name in this time-book, Charles Mizer.—A. Mizer was a colored man that worked with the stone-masons as a helper.

Q. What did you detect him in doing?—A. He was putting in the work dry.

Q. Behind the bench-wall?—A. No, sir; behind the spring of the arch. And I told Mr. Woodward to notice him and if he didn't do better to send him out, and Mr. Woodward found him continuing the same.

Q. Who was Woodward?—A. He was there assisting me as inspector; he was a young man; and so he sent him out.

Q. How long after you got in there did this event happen?—A. I couldn't tell you.

Q. Was that the only instance that you discovered of bad work on the sidewalls and spring?—A. Whilst I was there, yes, sir.

Q. Was that the only evidence you discovered of bad work behind the bench-wall and behind the spring of the arch?—A. I have seen the work slighted a little and called Woodward's attention to it to have it done better; to use the full amount of cement. I told him that it would have to be done better and I think the evil was cured, so far as he or myself was concerned.

Q. Was there any considerable amount of work that was done under your and Woodward's inspection that you required to be taken out and put in proper condition?—A. I don't think there was any. Mr. Woodward remained on at night several nights. I don't know what was done then; he might have found several.

Q. You say that when you had this man, who was sending down the cement, and the other man at the bottom, keeping count one night, you had suspected that there was something wrong?—A. Yes, sir.

Q. What made you suspect it?—A. Because there had not been the night before the proper quantity of cement used to my knowledge, and I wanted further proof of the bad work before I would venture to say anything.

Q. Were you on the night before?—A. No, sir.

Q. Then how did you know that there had not been the proper quantity used?—A. I knew just what cement was in the cement-house, and I knew just what amount of work had been done and just how many men had been working on it, and it was impossible to do it; and consequently I took the precaution, as I stated, in regard to the dropping of the brick. The Saturday night following Kirlin said to me: "Mr. Lucas, what are you going to do to-night?" I told him I had nothing to do but to go home; that I generally went home and staid there. He said, "Can't I get you to come down to-night and see how this work is being done by O'Brien?" I says, "Certainly;" and he says "Get there about 9 o'clock." I went between 8 and 9 o'clock; changed my clothing and went down, and then got up on top of the arch. I said: "Hello, how are you getting along?" He says: "First rate; did you come to help me?" I said: "No; Kirlin sent me down to see how you are getting along." They had keyed up 14 feet of the arch, and the roof I presume was about 15 inches high, not more, above the crown of the arch; and at the next preceding arch there stood a man in each bay throwing back in the hips of the arches in which they were standing in the bay of while this 14 feet was being left open. I said, "What are you going to do with that?" He said, "That is all right; I can finish that." I said, "You can't do that work; you can't get to it to put cement in and to put stone in, and you have got it keyed up, and it too low, so that a man can't get in." And then I looked around and saw the manner in which they were standing and throwing the stone in back of the hip and I said, "My dear man, did you read the specifications?" He said, "No, I didn't; but I am doing this just as I would if Kirlin was here." I said, "I thought you didn't know what you were doing; you are just spoiling a piece of work." "Well," he says, "if you were not an old man I would take you by the nape of the neck and put you out." I said "Thank God I am an old man, and I won't have my neck hurt." I reported that on Monday to Mr. Kirlin, but it was never recognized.

Q. What did he say when you reported it to him?—A. He laughed at it. I said, "You put me in a pretty position, sending me down without any authority to encounter a young gigantic man, and it might have

resulted seriously for me." He said, "I never took that into considera-tion at all." I then told him how the work was, but it was passed over.

Q. Can you not tell about what station that was?—A. I could not.

Q. Can you tell about how long it was after you began there?—A. I don't think that O'Brien could have been in there more than a week.

Q. When that took place?—A. When I went down on that Saturday night.

Q. How long was that Saturday night after the time when you re sorted to keeping an account of the amount of cement that went down?—A. It was before.

Q. It was the Saturday night preceding?—A. Yes, sir; it was before I had an account of the brick.

Q. That was the first thing that occurred?—A. That was the Satur day following after I had the brick dropped at the cement-house door.

Q. You had the brick dropped at the cement house before this Satur day night?—A. Yes, sir; I think it was on Tuesday night that those bricks were dropped at the cement-house door, and the next Saturday night I went in and saw this work.

Q. Your suspicions were aroused, I understand you to say, and tha led you to have the brick dropped and an account kept of the cement from the fact that on some night before you had seen that from the amount of cement that you knew was in the cement house there could not have been cement enough gone down to do the work?—A. Yes, sir.

Q. Was that your first suspicion?—A. That was the first. Now McNamara had been on this work before; that is, before O'Brien came there. Whether there was any bad work whilst he was there or not I don't know.

Q. But the first thing that occurred after you went there that excited your suspicions that everything was not being done just as it should be, was this matter of the cement in the cement house not having diminished as much as you thought it ought to in order to do the work they had done the night before?—A. I think so.

Q. This William Mills appears by the time-book to have been at work there for the first time in the week ending July 20?—A. That may be; he only worked a few days.

Q. When was this Mills event, with reference to your having the brick account made?—A. That was some time after.

Q. But I understood you to say that those two events—your getting suspicious about the cement and having the brick dropped, and your going down to see what O'Brien was about, at Kirlin's request—were within a week or so after O'Brien came on?—A. I think so; I couldn't tell; it was a short time after we started work there.

Q. You say Kirlin, when you first told him of this matter—which was the very day when you found by the brick account that only six barrels of cement had gone down—told you that you ought not to have said anything to the workmen or contractors about it?—A. Yes, sir; that I ought to have come to him.

Q. Was that when you and Kirlin were by yourselves?—A. Yes, sir; he carried me up the tunnel on purpose.

Q. Was Palmer there at the time?—A. Palmer was there at the time Palmer had met him before he got up to where the work was going on and then they walked up to where they were working on the arch at that time; and then Kirlin left him and passed by the men who were building the bench-walls, and came on to where I was just preparing to set a pro file, or had been setting, and there he said, "When anything of this kin

rs, just let me know; you don't want to let it be publicly known in unnel here."

Did you hear Kirlin say anything to Palmer on the subject of that that had been performed the night before?—A. I did not; all that ard him say was, "John, how did the finish look?" He said, "The n is all right."

Palmer's name is John?—A. Yes, sir.

You did not hear Kirlin say anything on the subject of this fraud had been committed?—A. Not at all, except as to how the finish ed.

Did you say anything to Kirlin on the subject of that fraud, in the ence of Palmer?—A. I went to Kirlin in the presence of Palmer n Palmer had resorted to such language, and I said that if I had re-ed it at all I would have reported that at higher quarters than when as there surrounding me.

You had told it to Palmer before Kirlin met Palmer, then, appar-?—A. I didn't say anything to Palmer about it at all; I spoke it icly in the tunnel before every man.

Was Palmer there?—A. No. When Palmer came to this man tin, the packer, he told him that I had found some fault with the that had been done the night before, and Palmer got on a high e and wanted to know why I didn't pull it out. I said, "No, I will ull it out; there is other ways to develop it without pulling it out," by that time Kirlin's light came in sight, and he went down the el and met him, and they came up.

So that you had no conversation with Kirlin in the presence of ner except what you have already stated?—A. He asked Palmer, hn, how is the finish?" and he said, "It is all right."

That was the first time you had seen him that morning, was it not, n he came in?—A. Yes, sir.

I understand you to say that you told Kirlin in the presence of ner?—A. No; there was some complaint made in regard to the that had been done the night before by O'Brien.

When they came up together and you were all three together, did not have any conversation on that particular subject?—A. Ex-ing to say that if I did have to report it further it would be to gher quarter.

You said that in the presence of both of them?—A. In the pres-of both of them.

Did Palmer make any remark about this bad work at that time?—Only he said, "Why didn't I tear it out?" I told him there were r ways of developing it without tearing it out; that I wasn't there hat purpose.

Was the work taken down?—A. No, sir.

Or the fault rectified in any way?—A. No, sir.

The work went right on?—A. Right on in the same category pre-y as before. I was taught to mind my own business and attend to wn work.

Did you ever have any conversation with Kirlin afterwards?—No, sir; I have never said anything to them about bad work at I did to others, and I did to Briggs; I called Briggs's attention ad work in Rock Creek when I was putting the bench-walls up e. I think that was in July. He just got up and waved his light said, "That is all right." I said, "You may think so, but it wouldn't ll right to me." He said since that that he reported it to Kirlin; ther he did or not, I am not able to say.

Q. That was Briggs at Rock Creek?—A. Yes, sir.

Q. But Briggs said it was all right, did he?—A. He said it was right. He got up and waved his light and then jumped down.

Q. What was the matter with that work?—A. The stone had been filled in right behind over the work up to sixteen courses, and the toothing at the end of the arch, the opening, was about a foot or so widened, perhaps a foot and a half, and the sixteen courses would be short 4 feet, and they used two parts of cement to one of sand on the toothing in order to make it appear there as if it was laid in mortar. That is what he said was all right. I told him it might be right for him, but it wouldn't suit me. But since I have been out of the tunnel he has told me that he did report it to Kirlin, but I say whether he did or not I am not able to say.

Q. But the next Saturday night after this matter, when Palmer was present, Kirlin got you to go down and watch O'Brien?—A. To see what he was doing and to report to him.

Q. Where were you and Kirlin when this conversation between you and Kirlin took place about you going down at night?—A. I am not able to say whether it was in his little office or whether it was in the tunnel; it was not at his request, and I told him that he had put me in a very bad position by sending me down.

Q. No; but what took place between you then before you went down? Did he say anything about what had taken place before?—A. No, sir.

Q. Did he give any reason for wishing you to go down at night?—A. He wanted me to see how he was doing the work, as he said. The following day after this matter, he said, "Well, how is it to-day?" I said, "One of the same things," that is, the preceding arches to be packed after this six-brick business; and he said, "How is it to-day?" and I said, "One of the same things; there is no let-up at all." He wanted me to go down that night, but I told him I had some business to attend to and couldn't; and he said, "Well, will you go down Saturday night?" I told him I had nothing to do then, and I would do so, and I did report to him just as it occurred, Monday morning.

Q. This conversation between you and him took place before Saturday?—A. Yes, sir; and again on Saturday morning he renewed it.

Q. And you told him in substance, if I understand what you mean, that the work was not being well done, you thought?—A. I did.

Q. And then he asked you to go down?—A. Yes, sir.

Q. Did he ask you to go down before you had told him this, or had ou first told him that the work was not being well done, you feared?—A. I had told him that the work was going on badly at night and I thought that that man had been brought there for the purpose of doing bad work. I told him if I was to be held responsible for that section—I was at that time, as I understood, considered his assistant—if I was to be held responsible for it I didn't intend to have such work done. Then he requested me to go down on Saturday night, which I did, and it developed just as I tell you.

Q. Did you report to Kirlin?—A. I did on Monday.

Q. Was anybody present when you reported to him?—A. I don't know that there was.

Q. Nobody was present when you reported?—A. I don't know that there was; I just went in his office and sat down, and told him what position he had placed me in by sending me down there without authority, and that he ought to have gone himself unless I had been clad with the proper authority.

Q. What was that bad work that you reported?—A. It remained in the same position as it did then.

Q. Kirlin, so far as the work went, did not have it taken down and done right?—A. No. sir.

Q. What did Kirlin say when you reported this bad work to him?—A. He didn't say anything; he only passed on; excepting this: He said "When you have got anything of that kind to tell, tell it to me."

Q. But I mean after you went down that Saturday night?

The WITNESS. Monday morning?

Q. You only told Kirlin what you had seen?—A. Yes, sir; and I told him what a position he put me in, and that settled it; he never said a word about it afterwards to me.

Q. Did he say anything about it then, when you told him that you had seen this bad work done under O'Brien's eye?—A. Kirlin said he would hardly have believed it?

Q. How long did O'Brien stay there after that?—A. I don't know; I have got a little note in my pocket here from Kirlin asking me to do a certain piece of work one night when I relieved O'Brien. I don't know whether you gentlemen can read it or not; it is torn to some extent.

Q. Look at that note, if that will help you about it, but before we go to anything else I want to ascertain, as nearly as you can tell, how long O'Brien staid there as inspector after you had told Kirlin this Monday morning what you had seen the Saturday night before?—A. He staid there until work started at Howard University shaft; at what time I don't know.

Q. How long do you think it was?—A. Judge, I don't like to think without I can make it positive.

Q. Was it after or before Mills left?—A. Mills was there when O'Brien was there too.

Q. Which went away first, Mills or O'Brien?—I couldn't tell you that.

Q. You went in the tunnel from day to day right along after you made this report of the Saturday night's observations, did you not?—A. I did.

Q. Can you not tell us somewhere near how long you thought O'Brien was still there?—A. I could not. He was working at night, and I was working in the day. Mr. Woodward finally began to work some extra hours at night; what hours he worked I don't know; what amount of work he did I don't know, because I had been giving my entire attention to the bench-walls and the arches up to sixteen courses high.

Q. Can you tell how long you staid there after this event?—A. I was never away more than one day at a time.

Q. When did you leave Champlain avenue east?—A. I left it on the 6th of August.

Q. Was O'Brien there then?—A. No, sir.

Q. How long had he been gone?—A. He might have been working there at night and I wouldn't have known it.

Q. Did you see him around there at all a little while before you left?—A. No, sir.

Q. He had been gone quite awhile, then, when you stopped on the 6th of August?—A. Not a very great while, a very short while; perhaps a couple of weeks.

Q. Did you know or hear whether O'Brien went to work at any other place in the tunnel after he left Champlain avenue east?—A. I heard he went once to look after a piece of work over at Rock Creek.

Q. Just on one occasion?—A. He might have went more; it appeared

like he was competent to run two gangs in the same night, if I un stood it aright; whether he was I don't know.

Q. Have you not any general knowledge or idea whether O'Brien employed in the tunnel there somewhere as long as you were?—A. was employed there from the time I came on and longer, but no Champlain avenue; he went to Howard University.

Q. So that O'Brien was at work in the tunnel somewhere or wa inspector after you left Champlain avenue shaft?—A. Yes, sir.

Q. And a long time after you had told Kirlin what you had seen u O'Brien's inspection that Saturday night?—A. Yes, sir.

Q. During the time you were in Champlain avenue east did keep any time at all of the workmen?—A. No, sir.

Q. Did you work over hours?—A. No, sir.

Q. Did anybody pay you for it?—A. Palmer gave me $3 for six ho work in two nights.

Q. Did he give you anything else for anything?—A. No, sir.

Q. Did he make you any gifts?—A. No, sir; but he wanted to m me a promise, and I wouldn't accept it. He came to me when I was ting on the bench-wall and he said, "Lucas, we haven't got any mo you know, and it will be some time before we get our estimate, but w we do I will have some money for you." I said, "You don't owe m money; I don't want any money." From that time out, then, his fe ers turned the other way.

Q. When was that conversation?—A. That was just after the he stood up on the arch and waved his light, remarking, "That is a way to build a bulkhead." But I said, "Yes, I have studied the sp fications, and am going to live up to them."

Q. When was it, with reference to the time, you and Palmer and lin met there when you had discovered bad work?—A. I couldn' save my life, tell you.

Q. Can you not tell us whether it was before or after?—A. If not mistaken, it must have been about the middle or the first of Ju

Q. Can you not tell whether this offer of Palmer to you, or state that he would give you some money when they got theirs, was be you had this disturbance about what you had seen when Palmer, lin, and you were all together?—A. I think this proposition to me before.

Q. Emery was not there on this last contract at all, was he?—A. sir.

Q. He went out and Palmer took his place as subcontractor? Yes, sir; I found him there when I went in the tunnel.

Q. Had you known Palmer before?—A. Yes, sir.

Q. What had been his occupation?—A. Him and Kirlin were on big 48-inch main, that I was speaking of, at the time I was made man; they had come from the Kanawha improvement, and had as ated together on that work. When that work was finished on the main Palmer went on the reservoir, and Kirlin went to the da Great Falls.

Q. What did Palmer do at the reservoir?—A. He went there a inspector over a piece of sewer, or conduit, that brought the w around.

Q. He was employed by the Government, then?—A. Yes sir.

Q. And he continued that employment until he came in as sub tractor under the main contractors?—A. Yes, sir; there was not for him to do as inspector, and, under the contract before this las was brought into the west of the tunnel as a boss over the brick-la

Q. That is, he was was brought in by whom?—A. Upon the recommendation of Kirlin.

Q. Yes, but who employed him?—A. Brennan and Emery. He demanded more work than could possibly be done by the men, and they kicked against him not being a brick-layer, and he had to go out. Consequently, he went back to Peterson, on the reservoir, and remained there until they finished that work, and then an appropriation was made for the tunnel—this last appropriation. There was no appropriation for the reservoir, and consequently Palmer, through Kirlin, in my opinion, was put as a subcontractor in the tunnel; I don't know it to be the case, but it has that appearance.

Q. So that Palmer at one time was the Government inspector at the reservoir?—A. Yes, sir.

Q. And from that he went to be a foreman or something under Brennan & Emery?—A. Yes, sir; in the tunnel.

Q. And from that he went back to the reservoir?—A. As a boss.

Q. Under Peterson?—A. Yes, sir.

Q. He was a subcontractor or something else there with Gleason?—A. I think so.

Q. And from there he came in to be a partner with Brennan, under the subcontract with Beckwith & Quackenbush?—A. Yes, sir. When I made application to Kirlin to come back in the tunnel as inspector, under the last appropriation, he said he had nothing to do with it, and then I saw Lieutenant Townsend, and I told him I was wanting something to do; that I was getting barefooted. He said, "Mr. Lucas, as soon as I can do something I will do it." I thought perhaps I would strengthen myself by coming up here and seeing a member of Congress who had occasionally dropped in my son's house, where he took a late supper at a restaurant dining-room, Mr. Taulbee, who lived in our neighborhood, and I saw him day after day, and I told him I would like to go to work and would be much obliged if he would give me a letter. He wrote a letter for me to Major Lydecker, asking to have me re-instated, and the Saturday following that letter I met Lieutenant Townsend in Washington Circle, right near where I live, and he said, "Well, Mr. Lucas, when are you going to be ready to go to work?" I told him, "At any time." He said, "Report to Kirlin." I did so. He told me to come Monday, the 15th, and I did so. The first man was Palmer. Kirlin had just said, "Poor Palmer, something will have to be done for him; he has nothing to do, and it is going to be a pretty hard winter; there is no appropriation for the reservoir, and something ought to be done for him." I told him that he was a deserving man, and something ought to be done for him.

Q. You thought Palmer was a deserving man at that time?—A. I did.

Q. Did you see or know of any other bad work still being done while you were inspecting at any other place besides those you have now mentioned?—A. No, sir; I knew that there wasn't material enough in the tunnel on the Howard University end to build the bench-wall, to say nothing about the packing of the arches. I had been over and set profiles and made cross-sections of the first section there, I think about 90 feet, and I found, from my judgment, that the material they had dropped in between the two sections of brick work had not stone enough in it to build the bench-walls, because it would require them to be 5 feet high, and it was 53 feet long, and it would take 1,060 linear feet of bench-wall, and there wasn't stone enough there to do it, but there was a good many rotten stones in the part next to the shaft that they could leave behind the 18 inches of bonded work. The first thing I

knew the work was going on, and it was very plain, when the work w
going on, to see that the amount of material was insufficient and th
the time they were putting it in was too short and it couldn't be po
sibly done properly, and the inspectors or the men themselves mu
know that the work must be done badly and not according to t
specifications.

Q. How did they get the material to build all that wall, if there w
not enough?—A. They put some down from the top and hauled so
stone from Rock Creek and some from Champlain avenue; but
wasn't possible to get the material in in twenty days. It would ha
taken at the least calculation two thousand barrels of cement to ha
done that piece of work at first.

Q. Do you mean cement for the bench-walls?—A. For the enti
masonry.

Q. Have you noticed anything of the masonry work that is bad?
A. I haven't been in there. I only know, from my knowledge of t
work, the time and quantity of work that was to be done, and time
which it was to be done, and material there, that you couldn't get
into the tunnel.

Q. Then, how could they build the bench-wall?—A. They could ha
built the bench-wall there easily. As I said before, they had a gre
deal of soft stone in the tunnel there that they could use back of t
18 inches of bonded work, and with what additional stone they cou
haul they could get sufficient stone to do the work. In fact, that w
the only piece of work in the entire tunnel under this last contract th
really required lining, where the rock was sufficiently strong to carry
without lining.

Q. Was the rock solid where you think the lining was not required?
A. Yes, sir, as solid as this Capitol.

Q. No cracks in it?—A. Yes, sir; there were plenty of cracks, plen
of fissures; there has never been any provision in the contract th
would protect it, either.

Q. Then how could you get along without a lining where these f
sures were? Would not the water leak through there?—A. There w
no pressure there at all. That is a mistaken idea. The water stan
upward of 100 or 150 feet deep in the hill, and that would relieve it
the pressure; it would submerge itself to that depth.

Q. So that when you say you did not think that part required linin
it was not because the water would not run out, for there was wat
coming in from the rocks around to balance it?—A. The water wou
balance itself.

Q. Then if you did not have a lining, and still the pressure of wat
that came in through the leaks from the outside would keep the tunn
water from running out, those two waters would mix, would they not?
A. Well, they would mix after they would turn the water in from t
reservoir and add about 30 or 35 feet in addition; then it would bring
pressure until the water would find its level in the hills, and then th
pressure would be taken off by means of the submerging.

Q. But the water coming from the hills through the fissures to ta
off the pressure would come in and mix with the water in the tunn
where there was no lining, would it not?—A. No, sir; it would be g
ing out all the time, in the same proportion as that which comes i
because it would be from the higher head.

Q. So that a part of the water which left the old reservoir, bein
higher, would run out through those fissures?—A. In the same propo
tion as it takes four pumps to keep it out now; it never shortened t

er from the first day they ever made the headings up to the present
e.
. How many hours a day do they work those pumps?—A. In the
nty-four hours I think they work those pumps about fifteen hours
dy work.
. Do you know how many gallons an hour each one of those pumps
throw out?—A. I do not.
. Do you know how long it took the tunnel to fill up with water
n the work was stopped through one winter?—A. I think in the
th week the water run out at Rock Creek shaft; it was either the
d or fourth week.
. Was the tunnel holed clear through at that time?—A. Yes, sir.
. So that the water would run the whole length of the tunnel up to
level where it ran out at Rock Creek?—A. Yes, sir.
. Have you noticed down in the tunnel from which side the water
es in chiefly, if there is any difference?—A. I think it is about cor-
ondingly, both bottom, top, and sides. I think in the section be-
en Champlain avenue and Howard University there is very little
kage from the bottom.
. That is all the way under high ground on the outside, is it not?—
Yes, sir; excepting one place, there at Seventh street, where there
little sag.
. Where does it come in there at that place the most? What kind
issures are there in the rock? Great cracks, or these seams, like
cks laid together without any cement between them?—A. In some
ances it is about as you said, like bricks laid together without any
ent; in others there is a very little to squeeze through, but a suf-
ent amount of weeping to accommodate such a supply as you find.
. Is there any place all through the tunnel that you have seen
ere the water comes in in a stream?—A. One place.
. And all the rest is mere weeping, as you call it?—A. There is a
d many steady streams, sufficient to drain all the springs in that
ion near the tunnel. They have taken the water from out there by
usdell's, along that high ground, and on west of Rock Creek again,
ween that and Foundry Branch; it has reduced the springs to a
e nothing; and at one place west of Rock Creek, with the flow com-
from overhead, it is about fully an inch, perhaps more, and at that
nt the springs above, taking the level, if I calculate right, is about
feet above the level of the tunnel.
. Did it drain that spring?—A. Yes, sir; well, it hasn't drained it
rely.
. But it affected it?—A. It affected it so that in dry weather they
't get the supply of water that they used to have, but in really wet
ther they get their usual supply; but it soon diminishes and goes
y again.
. Taking it all together, do you think the water that falls on the
face along back of the city here, soaks down into the ground near
tunnel and gets in, or where does it go if it does not?—A. Rock
ek, of course, would catch a great deal of it, and I suppose that
nch that comes down there west of Seventh street might take a por-
of it.
. There is no running brook west of Seventh street on the surface,
here?—A. No; it is only called a spring branch.
. I mean the water that sinks into the ground when it rains around
th of the city; where does that go to? Could it get into the tun-

nel?—A. It could, from the same source as now if it only supplied t water line that has been originally supplied from other sources.

Q. That is, water comes down through the gravel, crevices, and hol and gets in the cracks of the rock and through them into the tunnel? A. That is it.

Q. How would you like to drink that kind of water when the ci shall have 50,000 inhabitants all around there?—A. We wouldn't ha that kind of water then.

Q. My question is, how would you like to drink that kind of water? A. I don't think I would like to; but there is one thing—instead of t water going in, as you say, it will be forced back again and at a poi where it would be impossible for it to reach the tunnel.

Q. Suppose the tunnel was lined clear through and there was a cra in the lining, even below your point of pressure, and the water w drawn down considerably?—A. The water could never get into t tunnel.

Q. The water would go out of the tunnel?—A. The water would out and would supply the ground and make city springs and make artesian well anywhere.

Q. Suppose the level was drawn down so that the pressure would be outward, to clean out the tunnel, or to fix the reservoir, or to do a thing to stop the water coming in from the upper reservoir, then t water outside of the lining would come in, would it not?—A. Of cour as it is now, because they are keeping the pumps going to keep t water out; in that case the outer water must come in. But as soon the tunnel fills full of water to the water line of the hills, there it found its level. If you get additional water you must get it from t tunnel, and it will continue to find its level, and when it reaches th level it supplies those springs with more water than they have ever h and will bring an additional amount of springs into the city and p haps to the hills in the neighborhood of Rock Creek or in the city have been trying to find out which it would do. I gave Mr. Clemen a member of this committee, my theory of this whole affair; I do know as you gentlemen saw it.

Q. Was it in print?—A. No, sir; it was written. I have a copy o here.

Q. If you gave it to Mr. Clements it is all right.—A. I have been that tunnel, and I thought my judgment in regard to it was wo something, and I have classified it for all that it is worth, in my opini and I have shown that it would be like that tunnel, as I told you awh ago, under pressure, it would balance itself by its own submersion have compared it with a pipe running from here to Alexandria 1,(feet deep, on the same principles.

Q. Supposing that in this whole 14,000 feet now lined with bri arch, etc., three-fourths of the work, taking it all together, or one-h of it, is bad all along, from place to place, how can you account for happening without you and all your inspectors and without the c tractors knowing it?—A. The only reason I can account for it is ju this: In the first place, they never had inspectors enough on the wo to do it justice, and therefore no one man could see the amount of wo being done and do as they were required to do for the Government of United States, from the fact that there was too much for any one m to do. Before the headings came together the smoke was so dense th it was worth a man's life to remain there and do the work in a workm like manner. I have seen a man brought out on the car and sent in a dying condition, right by the arches; brick-layers also; they wo

the work through as hard as they could so as to get away as soon
ssible. An inspector couldn't stay there, the heat was so intense
he smoke was so great; he couldn't see 10 feet with the little light
d, and what did that amount to except to make more heat?.
Did you keep any thermometer down there?—A. We had one ther-
ter, and Captain Symons gave orders that when the thermometer
elow 34° not to send down any more cement.
How high did the thermometer go?—A. I never tried one down
, but it was so hot that I couldn't remain on the arch, couldn't
he there.
Take it in the last week of June, for instance.
e WITNESS. Since the headings have been through, you mean?
e CHAIRMAN. No, I mean before the headings were through. Take
he last week in June, say when the air outside would be at 90,
ould it be down there before the headings were through? Would
hotter than it was outside?
e WITNESS. The temperature wouldn't change 2° at any season
e year, excepting where the smoke and heat from the gas they
using was so great; the heat was great and the gas made an ad-
al amount of smoke.
Do you think it was hotter down in the tunnel, in the hottest
where men were at work, than it was outside at the hottest season
e year?—A. Yes, sir; at the crown of the arch, but below the
of the arch you wouldn't notice the difference; you would feel a
different when walking along, but only a little.
When it was holed all the way through, how was it then?—A.
it became better; the smoke had a way to get out then. Before
t had no means of getting out.
How much of this 14,000 feet of lining was done before the head-
vere all through?—A. I couldn't say; I don't suppose there was
than half of it. You must remember that under this last contract
have been doing some 700 to 800 feet a month with one gang of
whereas before that when they done 160 feet they were doing

That being so, say that about half of that which is now done was
before the headings were through, and the other half afterwards,
the atmosphere got better, how can you account for the continu-
ad work, supposing it to be continuous and general bad work all
, being done without you and the other inspectors knowing it?—
could not be done without it was purposely done.
Could it be done without the inspectors knowing it?—A. No, sir;
se the inspectors could remain on the work, for there was sufficient
ir so that they could live.
Do you think the contractors knew anything about this? I mean
his" this whole bad business, supposing it turns out to be bad busi-
—A. I couldn't say. I knew the subcontractors did, and I am sat-
that the chief inspector did, from the very fact that his knowledge
f such a character that he knew that there wasn't material enough
he parts of the tunnel to do the work, and he certainly couldn't
it to go undone, knowing that there wasn't material enough there
it.
The chief inspector had not so good a chance to know it as the
spectors had, had he?—A. No, sir; but yet his knowledge should
taught him.
If he must have known, as you say, from what he could see when

he came in, would it not be much more certain that the subinspec must have known?—A. I should think so.

Q. And would it not be still more certain that the subcontrac would know?—A. The subcontractors evidently knew just what going on.

Q. Who furnished the cement? It was the main contractors, B with & Quackenbush, was it not?—A. Yes, sir; and they alw had an abundance. Palmer would come to me and say to me, "I strange that one man only uses so much cement, and here it takes t times as much."

Q. There was nothing about the material, then, that would lead principal contractors, Beckwith & Quackenbush, to suspect that the was not being done right? They always had cement enough to well?—A. Yes, sir; and it was elegant material. Palmer came t at the beginning of the tunnel and says to me, "Lucas, I have just thinking that it is strange one man can send down and use only a cement in the tunnel, and here it takes three times as much." I "They are not doing as much work as I am." He said, "Yes, they Then I said, "If the others use as much as we use at this shaft, and a could get a contract for furnishing the cement to those shafts, he c put about $50 a day in his pocket.

Q. Were you using from 60 to 70 barrels of cement per day du the time this work was going on, which is represented on this dra which I have shown you before, and which is marked with the nam Mr. Wilson?—A. No, sir; we weren't doing 38 feet a day; we doing 6 feet a day. I have been examining that tunnel since you sh me that drawing; I presume that we used from 18 to 20 barrels a da that time, which would have been sufficient, of course, for 6 fe work. If you will take the amount of masonry in 6 feet, and take average of the tunnel, say it was 4 barrels to the foot, which woul an extravagant allowance, it would take each day about 24 barre cement. Consequently the cement would be brought in there in day-time, and it would take all the time of one man to bring it in.

Q. What became of that cement?—A. I can not believe that the nel is in any such shape as is represented there in that drawing.

Q. But supposing it is, how can you account for it?—A. I can account for it; it is a conundrum for me, if ever there was one in world. It don't show anything from springing line up; nothing sh from springing-line up on that drawing whatever, and it certainly cou be the case. It is impossible for it to be as described there. If t was nothing from springing line up, the arch wouldn't stand.

Mr. FAULKNER. I do not think it was intended to represent tha

The CHAIRMAN. That [pointing] represents the crown of the and that shows a vacant space above the crown of the arch; that i

Mr. FAULKNER. It is not intended to represent the packing o side-wall.

The CHAIRMAN. That shows a space above the crown of the where a man can walk continuously through the bulk-heads righ top of the arch.

The WITNESS. Mr. Senator, I can't get it through me that su thing could be done without there was somebody concocted a wa preparing the stones during the day and getting them in in the n time.

Q. Supposing there was no work done in the night?—A. It coul have been done that way under my supervision at all.

Q. It could not have been done without you knowing it, could it?

would have known it, and I wouldn't have had it. I have done a great eal of work.

Q. When did you leave the work?

The WITNESS. This last time?

The CHAIRMAN. Yes.

The WITNESS. On the 6th of August.

Q. How did you come to leave?—A. Because I had become in the way; s Kirlin told one of his friends, my mouth was too big, and I would ave to get out of the way.

Q. Were you discharged?—A. I don't hardly know what you would erm it.

Q. State what occurred.—A. I will tell you what occurred precisely.

Q. State what occurred about your going away at the time you went.—. We had run up the work within 50 feet of what they call the trimmers or nuckers; then Kirlin comes and looks over the work, and says, "Lucas, am going to break this gang up." I supposed of course I would be ent somewhere else. I can't remember just the date when that was. But the next day Major Lydecker was out there, and I think that was n Saturday. Kirlin says to me, "You and Woodward come up at din-ner-time." He says, "I want to show you something." We went up, nd he gives me a letter. I read it, and it showed that I would be fur-oughed until further orders. I went down and told Woodward to come p, and he did so, and he saw the same. "Now," he says, "you two nen will toss to see who shall remain and finish the packing of that rch and the keying." I said, "You can do as you please about it." So McNamara, the foreman, spit on a brick and threw it up, and it came lown, and I won the toss. I staid there then on until the 6th of August, which I think was on Monday, and it gave me the chance of two days that I got pay for that I couldn't have had, which would have been $5 for my two days' work, and then I says "Does this mean a dis-charge?" "Well," he says, "it looks like it." Says I, "Colonel, I thought I had laid the last brick in this tunnel." He says, "Now you finish out your month. You go up and see Mr. Smead at the west end, and have him take charge of the work of putting in the inlet."

Q. Who was Smead?—A. He was the engineer that had charge of the reservoir on the upper road. I went up and saw Smead, but I saw there was no chance. He then said, "I will see Smead myself," and he did so. By that time I had found out that they intended to start the work again on the Monday following my leaving, which would have been one week from the time I left. So I went down and saw Lieuten-ant Townsend, and I says, "Lieutenant, I see they are going to start to work, and I wanted to get back on it when it resumes, but it looks as if they were going to start it without me getting back." He says, "I will see about that," and he went out and saw Kirlin. Kirlin said I had threatened his removal. I had never done such a thing. I went out and saw Kirlin to know why it was that he said that I had threatened his removal, and he hid in his office and wouldn't see me. Finally he came up to the engine-house, and I says, "It is pretty warm." He said nothing, shook his head, and his countenance was terrible, such as I never saw before with him, because I thought he had always been the very best of friends. I says, "It is a warm day, isn't it?" He says "Yes." Says I, "By the by, Lieutenant Townsend tells me you should say I had threatened your removal." He says, "It is a damn lie, and you went down to that hellish corner and made such a remark." Said I, "Will you go down to that corner and see what remark I have made?" He said "No." He said, "I think you are a damned scoundrel." "All

right," said I, "I can't quarrel, I have other resources than to quar and I said, "The only thing I have got to regret when I leave the that I leave it without an inspector, including yourself." And I hav the information in my back room at home, a drawing of the worki the tunnel that I made myself. I gave him the information in my room at home how the working of the tunnel should be; I drew a of it, and he qualified himself to get the position to qualify himself through the tunnel like a race-horse and sit down and making re and not allow anybody else to do it. That was the only quarrel we

Q. Did that end your connection with the business?—A. That e my connection with the business.

Q. Was it communicated to you in any way from any source about that time that it was believed or suspected that you had bee faithful in the discharge of your duties?—A. Never. I was too ful; that was the trouble. So much so that I had become obnoxi those gentlemen, Kirlin and Palmer—those two men who had been friends, working together for many years, and by Kirlin going to M mara and saying to him, "Mack, you are using too many men," a the same time doing from 28 to 30 feet a day; and then saying to Kendalls, "You ought to turn three arches a day." Such a thing be impossible. How many bricks would there be in those three ar Two hundred and twelve bricks to the foot, and the arch 14 fee man couldn't handle them; he couldn't throw them in dry. H wanted it done. God knows I hope not to do that man any inju There was nothing that indicated anything else but what Palme Kirlin was one and the same contractor, in my estimation; whet is so or not I don't know, but it looks evident to be the fact. I hope it ain't so, but it appears to be so.

TESTIMONY OF PATRICK HEALY.

THURSDAY, *December* 6, 1

PATRICK HEALY sworn and examined.

By the CHAIRMAN:

Q. What is your age?—A. Forty-one years.

Q. What is your occupation?—A. Superintendent of tunnel wo

Q. What were you doing before you were superintendent of th nel?—A. I was foreman.

Q. Were you brought up to any trade?—A. Brought up as a

Q. What was your business about the Aqueduct tunnel?—A. P the time I was foreman there when they were sinking the shaft at ard University.

Q. When they came to the tunnel itself what were you doing I was superintendent then for Howard University heading.

Q. Who were your employers?—A. Beckwith & Quackenbush

Q. Were you superintendent at Howard University only, or we general boss all along the line?—A. At Howard University onl time.

Q. Was that the first time after the shaft was sunk?—A. Yes,

Q. What were your duties as superintendent?—A. To attend excavation in general down the shaft.

Q. When did you have any other duties to do than attending

excavation at Howard University?—A. Nothing more at any time except to look after the plant and all that.

Q. Had you any duties in regard to how the work was to be done?—A. Yes, sir.

Q. What were they?—A. I had to see that the work was done well.

Q. Was that all along the line after Howard University?—A. No, sir.

Q. You had, in fact, no duties as superintendent except at Howard University?—A. Yes, sir; at Champlain avenue.

Q. And your duties at those two shafts were to see that the work was well done?—A. Yes, sir.

Q. Did that include the lining?—A. Yes, sir.

Q. How often did you go in this tunnel as superintendent?—A. I would go there a good many times, sometimes; two or three times a day sometimes, and sometimes only once; it depends upon where I would be needed the most.

Q. What were you needed to do?—A. If there was any breakage or repairing of the track, or moving switches, or anything like that, I would be there and it was done.

Q. Were there any subcontractors?—A. Yes, sir.

Q. They were first Emery and Brennan?—A. Yes, sir; they were the first.

Q. And afterwards the subcontractors were Brennan and Palmer?—A. Yes, sir.

Q. Your business was at those two shafts to see that the men did their work well?—A. My business was mostly connected with the excavation, and when they took the contract I didn't attend to it after that, only to look after that—only to look after it once in a while.

Q. So that it was not a part of your duty under Beckwith & Quackenbush?—A. It was their instructions to me to look after it.

Q. Did you obey the instructions?—A. I did as well as I could.

Q. Then you did look after those subcontractors to see how they were doing their work?—A. Yes, sir; I did.

Q. Did you observe that their work was not being done well?—No, sir; I did not.

Q. In no instance?—A. One time I did.

Q. When was the first time that you observed anything going wrong?—A. The brick-layers raised the brick-work too high up and there was a point of ground that the bricks caught on before they packed under. That was the only time I ever came on it myself.

Q. Was that the only time you ever saw or knew of anything not being done as it should be?—A. After it was reported by the inspectors I knew it then.

Q. But I mean of your own observation and knowledge.—A. That is the only time of my own observation and knowledge.

Q. You never went into the tunnel when you saw that any packing was being omitted that was required to be put in?—A. No, sir; I did not.

Q. You never told anybody to let the thing go when you saw anything bad?—A. No, sir.

Q. When did you begin to suspect, if you did suspect, that that lining work was not being done according to the contract specifications and according to the way it should be?—A. It was only a little while before we suspended work.

Q. How long before?—A. I don't remember the time, really.

Q. Can you not guess?—A. It may have been a month or so at the time the Kendall brothers made their report.

Q. A month or so before that, or at that time?—A. At that tim
Q. Do I understand you to mean, then, that that was the firs
ever saw or heard of anything going wrong there except the ins
you have mentioned when the bricks would not go under the roof
The brick would go under, but they could not get the packing in.
Q. Was that the first time that you had heard of anything
wrong with that exception?—A. I heard it a couple of times before
Q. When were those times?—A. Some time during the sum
believe; I don't remember the date.
Q. Do you mean this last summer?—A. This last summer.
Q. What was it you heard then?—A. About the place being left
out being packed.
Q. Where was that?—A. At Rock Creek.
Q. Who was the inspector there?—A. O'Brien, I believe.
Q. How did you hear about it?—A. Colonel Kirlin told me so.
Q. He was the chief inspector, was he not?—A. Yes, sir.
Q. What did you do about it?—A. I don't think I had char
that place at that time; I did not have charge of it.
Q. Who did have charge?—A. I think Mr. Leroy did.
Q. Who was Mr. Leroy?—A. He had charge of the other half
work at this time.
Q. Under Beckwith & Quackenbush?—A. Yes, sir.
Q. Did you report to Beckwith & Quackenbush what you had
about that?—A. I did not.
Q. Why not?—A. Well, when I thought it over I did not th
was necessary, that was all; I didn't think so much of it.
Q. When was the other time you have spoken of, before the K
disclosure? You said you had heard two occasions.—A. Before I
tioned about what Kirlin told me? I don't remember what time
was; it was some time in the summer.
Q. Did you ever hear of any other instance of bad work?—A.
sir; at Foundry Branch.
Q. When was that?—A. It was somewhere before that, I belie
Q. Along early in the summer?—A. I couldn't say.
Q. Whom did you hear that from?—A. From Colonel Kirlin.
Q. Did you ever hear of any other instance?—A. No, sir; not
knowledge.
Q. Did you ever hear of any instance?—A. No, sir; I didn't.
Q. Wait a minute. Did you ever hear of any instance about
in that part of the tunnel which you say you were in charge
cepting the one you have mentioned, about the brick-work?—A. I
remember, sir.
Q. You do not remember of any?—A. No, sir.
Q. Where was the line between you and Leroy, with regard to s
intendence?—A. At Rock Creek.
Q. At the shaft?—A. Yes, sir.
Q. You had charge of all east of Rock Creek shaft?—A. Yes, s
this time.
Q. This last summer?—A. Yes, sir.
Q. And during the whole time that you had charge of that e
Rock Creek, do you say that you never heard of any bad work
No, sir; only what I told you.
Q. How many times in a week do you think you were in the t
looking after the work that you were superintending during
period?—A. I couldn't tell you, because I was there all the ti
around.

Did you make a habit of going into the tunnel every day?—A. every day.
And when you went in you went to see how the work was going suppose?—A. I went first to the heading.
When the headings were all gone through with, what then?—A. had to enlarge the tunnel then for the brick-work
Did you ever, during the time of your superintendency there, go to ow the work of alignment was going on?—A. I did, sir.
How often?—A. Three or four times a week, and sometimes twice , and sometimes I wouldn't go for two or three days.
How many places was the lining being built at those times when e now speaking of?—A. Only two places where they were working.
Where were they?—A. Rock Creek cast and Champlain avenue

And at neither of those places did you see or hear of any bad ?—A. No, sir.
Did you hear of anything slighted?—A. Only what I told you.
Anything that had been left undone that ought to have been done, ding to the contract?—A. No, sir.
Who were the masons in charge of the work at those two places?— almer was in charge at both places.
He was a subcontractor?—A. He acted as foreman and superin- nt both.
Was Palmer a mason?—A. No; not that I know of.
Who were the masons?—A. The Kendalls were there and the men ; I don't know their names.
Did you ever see any of their work while the Kendalls were work- —A. Yes, sir.
Did you see them working?—A. Yes, sir.
Did you see the packers working?—A. Yes, sir.
How were they putting in the packing?—A. As solid as rubble nry would lay.
All in tightly?—A. As tight as they could make it.
Going clear to the roof?—A. Clear to the back sides of the wall.
I am speaking now of the roof over the arch.—A. I would be in very seldom when they were keying the arch, because only one as an inspector was all that could get up there; he could get up look over.
Did you ever get up and look over?—A. Yes, sir.
What did you see?—A. I saw them laying stone.
What else?—A. Cement.
And you never saw bad work?—A. No, sir.
Or any vacant spaces left?—A. No, sir.
Or any attempt to cover up anything?—A. No, sir; I didn't.
When did you begin to suspect that something was going wrong ?—A. I didn't suspect it at any time.
I will take the place where the Kendalls were at work; the Ken- were masons, I believe, were they not?—A. They were brick- s.
That is what I mean, brick-masons. Do you mean to say, in con- on with their work as brick-masons in building the brick-work there, that you never saw any bad packing or any spaces left ?—A. No, sir; I did not.
You never heard anything said about any such thing?—A. Not what Colonel Kirlin told me about those two places.
But among the men, the foremen, the masons, the packers, and all

of them, you never saw or heard of anything going wrong?—A. sir; I didn't.

Q. Suppose in that work, of which you were superintendent fo principal contractors, for every 100 feet of lining there was anyw from 10 to 50 feet of bad work right along in spots, and spots all alon it now turns out to be. I will assume—I do not say that it is so, but posing it was so—how could that have happened without you kno it, if you were in as often as you say you were?—A. I might be i tunnel and not be up on the centers where they were doing that

By Mr. FAULKNER:

Q. As I understand it was part of your duty to see that this pac was properly done?—A. The excavation was mostly my work; I to keep the head masons on excavation. That is as much wor driving the heading.

Q. Then you really did not pay any attention to the question wh this packing was being done properly or not?—A. I would look it once in a while. I thought when the subcontractors and the ernment inspectors were there all the time it was not necessary fo to stand over their men too.

Q. And that is the reason you did not pay special attention t packing?—A. Yes, sir.

By Mr. DAWES:

Q. If you were there while it was going on, as an inspector, how c it happen that it could go on without you seeing it?—A. They cou do it while I was there.

Q. The question of Mr. Edmunds was how could it be that it be in this condition if you were there as often as you say you wer

The WITNESS. In the tunnel?

Mr. DAWES. Yes.

The WITNESS. I had the tunnel from Rock Creek to Howard versity.

Q. You have told that you were there every day a great many t and your duty was to be there as general inspector, to see everyt Now how could it be that every 10 feet or 50 feet or so there wou these spaces and you not see them if you were there a great many t a day and it was your business to see everything that was going o A. I couldn't see all along.

Q. It was your business to inspect one thing as much as another, it not?—A. I had 10,000 feet.

Q. Your business was to inspect one thing as much as another; were general inspector to see that everything was going on right, you not?—A. Yes, sir.

Q. Now, you were there constantly?—A. On the work; not in place.

Q. How could this thing go on with a general inspector there stantly, whose business it was to see that everything was goin right, without his knowing it?—A. When I was on top I consider was at work at Howard University——

Q. You considered you were down below when you were on to A. No, sir; I was on the work.

Q. But your business was to see what was going on below, n top?—A. Yes, sir; I had charge of the top too.

Q. Could there have been left a space 6 feet high and 7 or 8 feet

ıd wide on the surface above the arch, when you were there every day ıd your business was to see that everything was going on right, with-ıt you seeing it?—A. No, sir; I didn't see it.

Q. What I ask you is, could it have happened without your seeing it it is true that you were there every day, and it was your business to see verything that was going on while you were there?—A. It would take ıe half a day to go from one end to the other, and it may have been one before I could get back.

Q. You mean they could have built up these bulk-heads?—A. Yes, ir; before I could get back.

Q. As I understand from your answer, you were relying, to a great xtent, upon the Government inspector, too?—A. Yes, sir; certainly.

Q. To see that the work of the subcontractors was done according to pecifications?—A. Yes, sir; that is what I expected.

Q. Did you as superintendent of the original contractors give any rders to the subcontractors in any way to depart from the specifica-ions?—A. No, sir.

Q. And you had no knowledge by any interview with them that they ere departing from it?—A. I did not.

Q. Was it part of your duty to keep the tunnel in the proper align-ıent as given by the engineers?—A. Yes, sir.

Q. Do you know any part of the tunnel where there was a departure rom that alignment as given by the engineer?—A. No, sir; I don't now any part of it. Do I understand you right that the contractors ent by the line of the engineers?

Mr. DAWES. Yes.

The WITNESS. No, sir; not that I know of.

Q. When did you go on as superintendent for Quackenbush?—A. n 1884.

Q. And you know of no departure from the alignment given by the ngineer?—A. No, sir.

Q. And yet it was part of your duty to see that that alignment was roperly kept?—A. What I had charge of was all on line with the en-ineers.

Q. Was it also your duty to attend to the blasting and see that the roper charges were put in?—A. I left that to the foreman.

Q. Were no complaints made to you in reference to the use of too arge charges of explosives?—A. No, sir.

Q. By no one?—A. No, sir; I didn't see any one there that was a etter judge than myself to know that.

Q. Was there not a great deal of rock thrown down by the excava-ion that was not necessary to make the opening as large as the speci-ications required?—A. A lot of it fell down; yes, sir.

Q. Was not that partly attributable to excessive charges of powder r explosives that were used?—A. No, sir; it was that seamy rock.

Q. But no complaints were made to you in reference to that?—A. I ouldn't say now whether there was or not, because I don't remember.

Q. Would you not remember if the engineers in charge had called our attention, as the representative of these contractors, to that act?—A. I don't remember whether they did or not; there were many laces where the tunnel was too large and the rock fell down.

Q. Did they not complain to you that the cause of that was because ou were using too much explosives?—A. No, sir; I don't remember nything of the kind, of using too much powder.

Q. They never made any complaint?—A. Not that I know of

By the CHAIRMAN:

Q. In going through the tunnel did you ever notice that it crooked?—A. It was crooked.

Q. Do you think that was the original plan?—A. It was the gineer's line.

Q. When you noticed that the tunnel was crooked what did you t about it?—A. We didn't find it out until the engineers did.

Q. You can not see it?—A. I can see it now, since we have tu out from that line.

Q. Could you not see in any 200 feet whether the line was str or not?—A. The line was straight from the shaft, but it would be ning off from the point where they would meet.

Q. When it began to be crooked could you not see it?—A. Yes we turned off from that and Mr. Kirlin changed the line.

Q. And having changed the line, that is the only instance you of, of a crooked line?—A. That is all.

Q. Have you been through the whole tunnel?—A. I was the firs that went through it.

Q. You have been through it a great many times, have you n A. Yes, sir.

Q. In how many places is it crooked now?—A. I couldn't tell y

Q. A good many places, is it not?—A. A good many places.

Q. All along?—A. Not always, but some places.

Q. But taking the whole length of 20,000 feet, the crooked place not all confined to one particular spot, are they?—A. No, sir.

Q. How many different places, separate from each other and bet straight lines, are there crooked in there now?—A. They are abo a straight line now.

Q. All the way?—A. Only Champlain avenue west, and Cham avenue east, and Howard University.

Q. Straight lines between those points now, you think?—A. Yes about straight, or very near straight.

Q. You do not know of any places in there now, where there curve, or what, in railroad parlance, would be called a reverse c winding around to the right and then again to the left?—A. The one in Howard University.

Q. Is that where they changed the line?—A. Yes, sir.

Q. How did you get the reverse curve from changing one line alo A. It would have to go to one side and then to the other side, fro right to the left.

Q. Is that the only place where you now remember a crook There is one in Champlain avenue east, a pretty bad one.

Q. Where else?—A. In Champlain avenue west.

Q. That is two; where else?—A. That is all, in two places.

Q. Are they all the places where there are crooked?—A. The couldn't tell you how much it is out of line.

Q. Do you think it is out of alignment any?—A. It is out of align some places more or less.

Q. Do you mean to say that you think that all came from bad engi ing of the Government engineers?—A. Well, the Government engi didn't run them lines.

Q. Who did?—A. Their assistants.

Q. I take in the assistants when I say Government engineers. I the people employed by the Government?—A. Yes, sir; it was then ning the line, and then Mr. Coryell changed it back again.

Q. Do you mean that you followed every line that they laid down?—A. I did, sir.

Q. And that all the crooks that there are are to be attributed to their engineering and not to your departing from their lines?—A. I never departed from their line 6 inches.

Q. How did they lay down their lines?—A. They let lines down the shaft.

Q. Supposing you had a heading that was 300 feet in from a shaft, and you wanted to go 100 feet ahead; you knew that it was intended to be a straight line, did you not?—A. Yes, sir.

Q. What did the engineers do to furnish you the line; what marks did they make?—A. They drilled a hole in the roof and put a peg in, and then would let a line hang down.

Q. And then you could sight through those two lines, and so go straight?—A. Yes, sir.

Q. And you followed that method of alignment all the time?—A. That method of lining; yes, sir.

Q. That method of working according to the line?—A. Yes, sir.

Q. And you did not depart from that straight direction which those directions showed you?—A. No, sir; I did not. I hung lines down 2,200 feet from the center of the shaft; that was when work was suspended.

Q. What did you find then?—A. I found it all right.

Q. It was straight and in the right direction?—A. Yes, sir.

Q. That was not one of the places, then, where it was crooked?—A. The crook was between that point and the shaft; the line was not cut off altogether.

Q. Do you mean to say that that crook was made in consequence of your following the line which they thus provided by hanging down?—A. Yes, sir.

Q. And they were hanging in the wrong direction?—A. Yes, sir.

Q. How soon did it take them to discover it?—A. In 600 feet of Howard University.

Q. Then they found they were going wrong, and then they changed the direction?—A. Yes, sir.

Q. Did they make that change of direction by providing for a straight line that would hit the other heading?—A. They made the change to strike the other heading.

Q. That would be a straight line between the point where they made the change and the next heading, would it not?—A. Yes, sir; it made a straight line from the shaft.

Q. Then, you would have at that place one single curve, would you not?—A. It was a reverse curve.

Q. Mr. Coryell's way of correcting a mistake of that kind was to make a jog, was it?—A. Yes, sir; it was somewhere about 3 feet from one over to the other.

Q. And then, having made that jog, he went straight towards the other heading, did he?—A. Yes, sir.

Q. And that is what you call a reverse curve?—A. Yes, sir.

Q. Was that true of all the other places where you went out of line?—A. No; Champlain avenue east, they had about the same trouble there; I wasn't superintendent of Champlain avenue east at the time they made the change there.

Q. Was there any time when you were superintendent that the grade was not kept right?—A. They changed the grade at this point [point-

ing on the map] from 11 inches to the 100 feet to 6½ inches to the 1(
feet.

Q. What was the reason for that?—A. I suppose they run up grac
too much at their meeting point.

Q. Do you not know that the engineers informed Beckwith
Quackenbush that they (Beckwith & Quackenbush) had not made t
grade according to the lines that had been laid down, and that they mu
correct it?—A. I went according to the line and grade that was giv
me.

Q. I asked you if you did not know or had not heard that the eng
neers had informed Beckwith & Quackenbush, in writing, that f
quite a long distance they had not worked the grade required and la
down by the engineers?—A. No, sir.

Q. And that it had to be corrected afterward?—A. No, sir. I nev
run more than about 6 or 7 inches, sometimes above or below, grade
any time; sometimes the muck would be on the track at the bottom.

Q. Did you ever hear of any such thing as I have been talking abou
a complaint made by the engineers to Beckwith & Quackenbush th
the grade was not being run according to the line?—A. No, I nev
did.

Q. Did Beckwith & Quackenbush ever give you any orders to c
out the grade, or cut it in some way quite a long distance at the botto
to bring it to grade?—A. They never gave me any orders for that. W
blasted bottom, sides, and roof, where we drove a small tunnel to e
large it for brick-work. You see the tunnel was narrow and we had
make it some wider, and then of course had to take up some of t
bottom.

Q. You never had any instruction from Beckwith & Quackenbu
whatever to lower the grade anywhere?—A. No, sir.

Q. Did you ever take out more of the bottom?—A. We took it up
grade; that was all.

Q. If you took it out to grade, and you had blasted before above hig
enough, that would leave it higher than was necessary from the top
the bottom, would it not?—A. When you are driving a tunnel alon
you have got to come back and clean up all the muck and mud, an
some places lots of rock has to be quarried out.

Q. If you were required to have the tunnel only 7 feet high and
feet for brick-work, which would make 9, what would you think abou
running the tunnel 10, 12, and 15 feet high?—A. That would be a gre
deal higher than necessary for the lining, and there would be a lot fa
down.

Q. I am not speaking of falling rock; that is another thing. Bu
supposing you had made the grade above the required grade—had n
blasted out low enough in the bottom—and so had got your top abov
where it ought to be, when you did blast out the bottom you woul
have a larger hole than you wanted, would you not?—A. Yes, certainl
I never drove a tunnel like that.

Q. How high is the rock roof of that tunnel above the rock bottom
the tunnel?—A. It is supposed to be 11 feet.

Q. That is the lowest place?—A. Yes, sir; this last time they had
feet.

Q. How high is it, as a fact, on the average do you think? Suppos
there had not been any brick-work or any bench-walls put in at al
and the tunnel were now cleaned out, you understand, so that there woul
be nothing in it but the rock bottom, top, and sides, how high woul
the tunnel be all the way through, taking it on the average?—A. Abou
12 feet, I expect.

. And the height in the clear was required to be 7½ feet, was it ?—A. That was on the starting of it, when the tunnel was first ted; they drove it in 600 feet to this point where they changed the k.

. Then how high was it to be ?—A. Twelve feet.

. It was to be 12 feet in the clear, was it ?—A. Yes, sir; 12 feet high 12 feet wide.

. What was that for ?—A. To let in the lining.

. If the tunnel when lined was only to be 7 feet high, why would want it to be 12 feet in the clear ?—A. They wanted a few feet for ber if it was necessary to put it in.

. Did you yourself keep any memoranda or books showing your y operations ?—A. No, sir.

. Did you ever have any money except from Beckwith and Quack- ush ?—A. No, sir; not except what I earned.

. They paid you what you earned ?—A. Yes, sir.

. You never received any money from them except for your regular es ?—A. No, sir; not 1 cent.

. What were your wages ?—A. One hundred dollars a month.

. Did you ever receive any money from anybody else in connection the tunnel ?—A. No, sir.

. Did you ever pay money to anybody else ?—A. No, sir; I did not.

. You did not pay the men ?—A. No, sir.

. You did not pay the inspectors for overtime ?—A. No, indeed.

. Did you ever make presents to anybody ?—A. No, sir; I didn't.

. How often did either Beckwith or Quackenbush come into the nel ?—A. The first two years they used to come in pretty often, e a week or so.

. That was in 1884–'85 and in 1885–'86 ?—A. About 1884 and 1885.

. And that was before any of this wet packing, as I will call it, was in, was it not ? It was all dry packing in 1884 and 1885 ?—A. The t that was done was dry packing.

. After 1884–'85 and in these later years how often did they come the tunnel ?—A. They didn't come in very often for the last two rs. I never saw Mr. Quackenbush down but a couple of times, I ieve.

. How often was Beckwith in ?—A. I don't think he has been down two years.

. He has not been here in Washington much for the last two years, he ?—A. No, sir.

ADDITIONAL TESTIMONY OF JOHN V. QUACKENBUSH.

FRIDAY, *December* 7, 1888.

JOHN V. QUACKENBUSH voluntarily appeared before the committee d desired to make the following statement:

The WITNESS. All I have got to say, Senator, is that since I was here t I have learned that there are names on that check-roll book of lmer's & Brennan's that are assumed names, not the original names the men that received the money.

By the CHAIRMAN:

. You mean on the time-books that you left with us ?—A. Yes, sir; the time-book.

Q. Do you know what names are the assumed or fictitious names?—A. I don't know; I have made no inquiries. Whether that was to deceive me or not I don't know. Mr. Palmer will know, and the time-keeper that kept the time.

By Mr. DAWES:

Q. Will he disclose truthfully, if he put the fictitious names on there?—A. They are assumed names.

Q. Do you suppose a man would do all that and then tell of it?—A. I don't know as to that. You can make all the inquiries you want to. Then I want to say something in regard to the West Point tunnel in regard to which I was inquired of the other day. I was at New York yesterday, and I saw Mr. Taly, chief engineer of the city of New York at this time, and he was speaking of our misfortune of the investigation that was going on here. He is a gentleman I worked under a long while, and I told him I didn't feel at the present time that I could meet an honest man. Then he said that Mr. Sweet and Mr. Young were doing the work for the West Shore Railroad Company, and they made arrangements to take the work and do it themselves. At the time that accident happened the work was being done by day's work, and the men only had incentives to do good work.

By the CHAIRMAN:

Q. Who was the time-keeper who kept these books?—A. Albert Heitmuller.

Q. Do you know where he lives?—A. Yes, sir; he works for us at the present time.

Q. Can we find him at your office?—A. Yes, sir; he will always be reached there.

Q. Has the time-keeper told you that some of the entries in these books were not true, were fictitious names?—A. No, sir; he didn't say they were not true, but he says they are fictitious names, and also Mr. Palmer tells me so.

Q. Who got the money that is attributed to them on their time?—A. I don't know; the money, as I understand it, passed over to Mr. Palmer.

By Mr. DAWES:

Q. Passed over to him, and was then put on the time-book as being wages of day laborers representing those names?—A. Yes, sir. Mr. Perry recommended me to come and tell you. After finding this out I stated the case to him, and he recommended me to come here and tell you.

The CHAIRMAN. I wish you would cause a statement to be made for us from your books of the total amount altogether, on every account, that you paid to Emery & Brennan, and Brennan & Palmer, under the first contract with them, if you had more than one, and then under the second contract, so as to distinguish between dry packing and rubble masonry packing.

The WITNESS. Shall I send it to you with Mr. Leroy?

The CHAIRMAN. Yes; if you please.

By the CHAIRMAN:

Q. Where did you find Patrick Healy, your general superintendent, as I believe you stated him to be, when you first employed him?—A. In the first employment he came here as a shift boss; he was formerly from Baltimore.

And afterwards he became your superintendent, as you stated you were on the stand before?—A. Yes, sir.
And you, I suppose, have known him ever since, and he is yet in employ, is he not?—A. Yes, sir.
Do you think he is a competent man to be superintendent of such ?—A. Yes, sir; he is one of the best men I know of, honest and le in all shapes, I think.

TESTIMONY OF JOHN M. PALMER.

FRIDAY, *December* 7, 1888.

N M. PALMER sworn and examined.

By the CHAIRMAN:

What is your occupation?—A. My occupation has been superin- g and inspecting work.
What kind of work?—A. For the last four years in connection he water-works and Washington Aqueduct.
When did you first come to Washington to reside?—A. I first May 6, 1884.
Where did you come from?—A. I came from West Virginia.
What had you been doing there before you came here?—A. I had superintending work for the Government on New River; I had e of the Greenbriar division of the improvement of New River.
Did any other persons connected with the work out there come t the same time with you, or substantially at the same time?—A. irlin came before I did.
Were you and he on the same work?—A. Yes, sir; for a short two months.
Was he also a superintendent?—A. Yes, sir.
Which of you was the superior officer?—A. Mr. Kirlin was the or at first, and I afterwards superseded him.
You were deputy, or sub, or whatever?—A. Yes, sir.
When you came here did you go into the employ of the Govern- —A. Yes, sir.
What did you do first?—A. I was connected with the laying of -inch main, from L street to the reservoir; I had charge of that

And was Mr. Kirlin connected with the same main?—A. Yes, sir; k for about two months.
Were you both at work on the main at the same time, superintend- ?—A. Yes, sir.
And you were still his deputy, or assistant, or whatever?—A. I ntil he left; I think he left in July, and then I took general charge work.
Where did he go?—A. He went to the dam at Great Falls.
After you had finished your duties in regard to the new main, lid you do next?—A. I was then one of the inspectors on the new oir.
Who were the other inspectors?—A. There were several; one was Brenizer; there was Mr. Chadwell—I don't know his first name— en there was Mr. White. I think that is all there were when I here.
Were they all there when you went there, or were those success- A. No, sir; they were all there when I went there.

Q. How was it necessary or requisite to have so many inspectors?—A. They were all on different classes of work.

Q. What class did you inspect?—A. I inspected generally the building of the west conduit and the paving of the west side of the reservoir. The west side of the reservoir was, in fact, principally my work.

Q. When did you leave that work?—A. I left that work in January, 1886, I believe.

Q. What did you go to doing then?—A. I was in the tunnel, at the west end, for about one month.

Q. What was your duty there?—A. I was foreman of one of the forces at the extreme west end.

Q. Under whose employment were you then?—A. I was under the employment of Brennan & Emery.

Q. You ceased to be in Government employment, then, in June, did you say, 1886?—A. No, sir; I think it was in January, 1886.

Q. Have you ever been employed by the Government since?—A. No, sir; I have not. After that month I then took charge of the completing of the reservoir for the contractors, G. Peterson & Co.; that was the style of the firm.

Q. They were carrying on the building of the reservoir under the Gleason contract?—A. Yes, sir.

Q. Whom did you arrange with to carry on that work under Peterson?—A. Mr. Peterson.

Q. Was that arrangement in writing?—A. No, sir.

Q. Were you employed as superintendent?—A. Yes, sir.

Q. At wages?—A. At wages.

Q. How much?—A. $150 a month.

Q. Was that arrangement between you and Peterson made while you were Government inspector?—A. No, sir.

Q. How long had you ceased to be a Government inspector when you made that arrangement?—A. I think this was on the 15th of March that I was employed by him.

Q. And you ceased to be a Government inspector in January preceding?—A. I think it was in January; yes, sir.

Q. What were you doing between January and March?—A. With the exception of the month that I was in the tunnel, at the west end, I was not employed at all.

Q. Were you in the tunnel that month at the west end at a time immediately preceding your going to work for Peterson?—A. Yes, sir; immediately preceding.

Q. Was that arrangement made between you and him while you were foreman at the west end?—A. Yes, sir; well, it was talked of. I left the work when he took this work of Mr. Peterson's.

Q. And when did you terminate your work at the reservoir under Peterson?—A. The first of December last.

Q. The first of December, 1887?—A. Yes, sir. We practically finished this contract in November, but some of the work extended for three or four days into December.

Q. Who were the inspectors at the reservoir during the time you were superintending work for Peterson?—A. There was only one regular inspector. I omitted to say that when I first went there Mr. Potts was also an inspector; I had forgotten his name; he was the only man that was known there as an inspector when I was superintending the work for Mr. Peterson.

Q. What is Mr. Potts's first name?—A. A. R., I think.

Q. Where does he live?—A. He lives in the city, I think, on Seventeenth street, south of Pennsylvania avenue.

Q. Is he an engineer, or what, by profession?—A. I think he has been connected with the Army for years; he is quite an old man; he is known as Captain Potts. I think he was in the commissary department on the frontier for a long time.

Q. And Potts was at the reservoir as inspector while you were there as inspector. Was he principal inspector while you were there under Peterson in finishing up the Gleason contract?—A. Yes, sir; he was one of the inspectors.

Q. When you finished the work at the reservoir under Peterson, what did you do next?—A. I did nothing, sir, until I went in the tunnel this last spring; the 8th day of May I agreed with Mr. Brennan and Mr. Quackenbush.

Q. What sort of a contract did you make with Brennan for your operations in the tunnel?

The WITNESS. This present season?

The CHAIRMAN. Yes.

A. There was no contract with Brennan at all. I had to contract with Quackenbush.

Q. Then you must have contracted with Brennan before you did with Quackenbush, for you and Brennan were partners, were you not?—A. Yes, sir; but there was no writing.

Q. What were your respective shares, as between you and Brennan?—A. We were equal partners.

Q. Emery, who had been with Brennan before, went out entirely?—A. They both went out entirely.

Q. That old contract was ended, was it?—A. Yes, sir; I so understood it.

Q. And you and Brennan made a new contract with Beckwith & Quackenbush?—A. Yes, sir.

Q. Did Emery retain or have any interest in the new contract?—A. No, sir.

Q. Did any other person except you and Brennan?—A. No, sir.

Q. At any time?—A. No, sir.

Q. How did the second contract differ from the one that Emery & Brennan had?—A. I think it was practically a duplicate of the first contract, with the exception of a change in the class of work. Originally the side walls had been built of brick, and the invert also; in our contract the side walls were built of stone. That, I think, is the only difference. I think the prices for their brick-work and for packing were the same as with Brennan & Emery; at least I so understood it.

Q. What kind of packing did your contract call for?—A. There was no specified packing in it. We had no specifications in our contract; it was simply to be done to the satisfaction and acceptance of the engineer and inspectors in charge.

Q. Did you not know what kind of packing was expected under that contract?—A. Yes, sir.

Q. What was expected?—A. It was to be rubble-work (so termed), stone thoroughly bedded in cement.

Q. Did you yourself have charge of the work?—A. I had charge of the work east of Foundry Branch; that is to say, I had charge of the work in Rock Creek east and west, and both ways in Champlain avenue, and in Howard University.

Q. And Brennan had charge west of Foundry Branch?—A. Yes, sir.

Q. Were there two headings at Foundry Branch?—A. Yes, sir.

Q. Brennan had charge of both headings at Foundry Branch?—A Yes, sir.

Q. And you had charge of both headings at Rock Creek and Champlain avenue and the heading at Howard University?—A. Yes, sir.

Q. How often were you in the tunnel?—A. Well, sir, I spent the most of my time there. I think there was only one working day during the summer that I was out of the tunnel entirely. I was generally one of the first men in the tunnel in the morning, and pretty generally the last one out in the evening, or with the last ones away from the work in the evening.

Q. Did your firm keep books?—A. No, sir.

Q. No kind of books?—A. No kind.

Q. Not even minute-books?—A. I kept a memorandum-book to make notes in in relation to my work.

Q. What memoranda did that book contain?—A. It simply contained any memorandums that I wanted to make in reference to the work; in regard to changing my men from one place to another, etc.

Q. Did it contain a list of the persons that were working for you?—A. No, sir.

Q. You employed a good many laborers, did you not?—A. Yes, sir.

Q. You had no books that contained their names?—A. No, sir.

Q. Or who paid them?—A. No, sir.

Q. Or what their wages were to be?—A. I fixed their wages generally myself on work that I was superintending.

Q. How many men altogether did you have under your personal charge?—A. Well, sir, I presume I had an average of a hundred.

Q. Can you remember how much each man was to have?—A. Well, sir, their wages were fixed, and their wages were given to the time-keeper. I might explain that all those accounts were kept by Mr. Quackenbush; his time-keeper kept the time of my men, the same as he did of those of Beckwith & Quackenbush.

Q. Who was his time-keeper?—A. His name is Albert Heitmuller.

Q. Heitmuller kept the books?—A. Heitmuller was known as the time-keeper; he kept all the time. I will say that I received a weekly statement of our account from the office through Heitmuller.

Q. Did that contain the names of the persons employed?—A. Yes, sir.

Q. And how much had been paid to them?—A. Yes, sir.

Q. Where are those weekly statements?—A. I have them at my house.

The CHAIRMAN. I wish you would bring them up here the next time you come, if you please.

The WITNESS. I will do so.

Q. Have you any other papers concerning the tunnel business except these weekly statements and the memorandum book you speak of?—A. I have a copy of the contract.

The CHAIRMAN. We have that.

Q. Have you any others?—A. No, sir. I have one or two monthly statements of our account.

Q. They would be a mere summing up of the weekly statements that you got?—A. Yes, sir.

Q. Is that all?—A. That is all; yes, sir—that I can think of.

The CHAIRMAN. Please also bring up that memorandum book when you come again.

Q. In this work that you had personal charge of, who were the persons you relied upon to see that the masonry and the packing were

ne according to what you understood to be the requirements of the ntract?—A. I had a foreman for each gang of masons; I only had o regular gangs of masons; one of them was James Lanigan.
Q. Will you please tell where James Lanigan lives?—A. He lives on street, between Eighth and Ninth, southwest.
Q. Who was the other?—A. The other was Thomas Lanigan; he es in the southwest; I really don't know where.
Q. He lives in this city?—A. Yes, sir; he lives in this city.
Q. Was there anybody else that you relied upon to watch the work?— I broke up one mason gang, split up one and made two, and made third one. Kenneth McCloud was in charge of that for a short time.
Q. Where does he live?—A. He lives in the Kanawha Valley, West irginia; at Brownstown, I think.
Q. Anybody else?—A. That is all the stone men. We usually had e bricklayer out of each gang to look after those, and foreman of the asons and side-walls.
Q. Now, give us the foremen of the brick-work.—A. The foreman in e early part of the work—that is to say, in June and a portion of ly—was Frank Thompson, in Rock Creek; he was one of the brick-asons.
Q. Where does he live?—A. He lives on I street northeast.
Q. Who was the other?—A. There were four Kendall brothers; they ere engaged most of the time in Champlain avenue.
Q. Who else?—A. There was another foreman in Champlain avenue the name of Michael McNamara; I might state that he had general harge of the overlooking of the work, and his attention was frequently lled to matters below the scaffold, to getting in stock. He usually ept a time-book of the time of his men; I don't know that he kept it ecially correct; he kept it more to become familiar with the names of e men than for any other purpose.
Q. What became of that time-book?—A. He has it, I presume.
Q. Were there any other people on whom you relied to see that the ork was properly done?—A. Yes, sir. Later I had a man in charge Rock Creek, by the name of Frank Martin.
Q. Was he foreman of masons or stone-work?—A. He was originally packer.
Q. Did he act as foreman of stone or brick masonry, or both?—A. He as with the brick masons.
Q. And he was carried as a packer, you say?—A. He was originally packer.
Q. Anybody else?—A. I think from about the 15th of October there as a man by the name of J. J. Goshorn.
Q. Where was he, in what charge?—A. He was in charge in Cham ain avenue, east.
Q. Where does he live?—A. He is here in the city now.
Q. What is his address?—A. No. 1710 I street.
Q. Where was he in charge?—A. He was in charge in Champlain venue, east.
Q. Anybody else?—A. That is all I think of.
Q. Did you give any personal attention yourself to the way the work as going on?—A. I did somewhat. The duties that I assumed were look after the work in general and to organize and regulate the force suit the emergencies of the work. I might explain that there was a ood deal of change of gangs from one place to another where the work as ready for it.
Q. You paid off once a week?—A. Once a week; yes, sir.

Q. How did you manage to pay off if you kept no time-book yourself?—A. Beckwith & Quackenbush paid all our men.

Q. How did they pay them?—A. They paid them weekly, in envelopes.

Q. Did they pay them directly through their own agents?—A. Yes, sir.

Q. You did not receive the envelopes?—A. No, sir. I might have received some for some who were not there, that did not happen to be on the work that his paymaster was on.

Q. Do you know whether you did or not?—A. Oh, yes; I know that I did.

Q. But except for the men who were not there you did not receive any?—A. No, sir; not to my memory.

Q. What man of Beckwith & Quackenbush's force brought the envelopes to the shaft?—A. Mr. Leroy was the regular paymaster, and Mr. Heitmuller was the time-keeper, though he sometimes paid the men in passing through the tunnel at their work.

Q. How did Heitmuller keep the time? Was he down in the tunnel?—A. Yes, sir.

Q. What kind of books did he have there to keep the time in?—A. He had ordinary time-books for workmen.

Q. You saw them, I suppose, from time to time?—A. Yes, sir.

Q. Do these books that we have here look like them?—A. No, sir; those are not the books he carried in the tunnel.

Q. Did you ever see these books before?—A. I don't think I ever did.

Q. They purport to be time-books of work during all these years. No. 3 is one you know something about?—A. I never knew any of the books in the office.

Q. You do not know anything about that, then?—A. No, sir; those he kept were small, ordinary time-books.

Q. Where is Heitmuller?—A. Still in the employ of Beckwith & Quackenbush, I think.

Q. How often did it happen that you received envelopes which were not delivered by the time-keeper or by Leroy actually to the men who were entitled to the money?—A. I don't think with my own men, that is my own laborers and mechanics, it occurred more than two or three times. But I might state that there were inspectors who were paid for extra time, that were paid in the same way, with envelopes, that I generally took myself and handed to the inspectors.

Q. How frequently was that?—A. In the early part of the work I think Mr. Heitmuller paid them himself; Mr. Leroy was not here in the early part of the work this summer, and Mr. Heitmuller generally paid them himself; but when Mr. Leroy came on he generally gave me the entire lot.

Q. A large lot of envelopes?—A. The entire lot; there was generally only one or two during a week.

Q. For the inspectors?—A. Yes, sir.

Q. But Leroy would give you the whole mass. When you say a "large lot" do you mean the whole mass of envelopes for the laborers?—A. No, sir. I might explain that this occurred only two or three times that he gave me the envelopes for two or three of the men that perhaps would not be on the work.

Q. Did he give you the envelopes for the men that were on the work?—A. No, sir; he always paid them himself.

Q. What did you mean by a "large lot" of them; that was the ex-
ession you used a few minutes ago?—A. I said the entire lot.
Q. What did you mean by "the entire lot?"—A. I meant the inspect-
s who were paid for extra time—all the inspectors that were paid.
Q. How many envelopes would the entire lot embrace?—A. Proba-
y two or three; I don't think over three a week.
Q. Had you agreed to pay the inspectors for overtime?—A. I paid
em under protest at first. The first night's work that we had there,
hen the inspector demanded pay for his stay, I said that as there was
o one there to refer the matter to I would pay him that night, but I
dn't intend to make a practice of it.
Q. Do you mean that that was for night work, or for overtime in the
ay?—A. It was for night work, or rather it was for after 5 o'clock.
Q. But in a shift that way did they work clear through the night?—
. No, sir. That was the man I spoke of on the first night's work.
fter that I asked for a regular night inspector.
Q. Have you anywhere in your books or papers any statement that
ould show how much you paid for this inspection?—A. No, sir; I have
ot.
Q. Do you know of anybody who has?—A. It will all be shown, I
ink, in the books of Beckwith & Quackenbush; it was all paid by
em and through that same channel.
Q. And paid by them in the way you mentioned?—A. Yes, sir.
Q. By having money, or what purported to be money, in an envelope,
ith the name of the person for whom it was intended on the envelope,
suppose?—A. No, sir; I don't think there was any case that the same
ame of the inspector was on the envelope. They were generally ficti-
ous names for the inspectors.
Q. Can you remember any of those fictitious names?—A. I think I
n. I would like to explain that the time-keeper made this arrange-
ent himself and put the names on for those inspectors.
Q. My question was, if you could remember any of these fictitious
ames?—A. I think I can. I think Mr. Lucas was known as John
ukes.
Q. And the money intended for him would be in an envelope ad-
ressed to John Lukes, then?—A. Yes, sir.
Q. Give us another *nom de plume*.—A. I think the name for Mr.
'Brien was John Night.
Q. And the envelope bearing the name of John Night you understood
o be intended for O'Brien?—A. Yes, sir; that was my understanding.
Q. Go on. What was another fictitious name?—A. I don't think I
an remember the others; that is, I don't think I can remember where
hey belonged. I think there was one John Smith, but I don't know to
hat inspector that name belonged.
Q. And then the other fictitious name—you think it was John Smith—
as for some other inspector?—A. Yes, sir.
Q. Do you remember any other fictitious name?—A. No, sir.
Q. Do you think there was any?—A. Yes, sir; I think there was.
Q. How many more fictitious names do you think appeared?—A.
rom my recollection there were four inspectors that I know of that
ere paid in that way.
Q. Who received pay under fictitious names?—A. Yes, sir.
Q. You have only named two—Lucas and O'Brien—and one other,
mith, which last name you do not attach to any particular person?—
. Yes, sir.

Q. Can you name any other inspectors besides O'Brien and Lucas who were receiving money under some fictitious name?—A. Yes, sir.

Q. Who were they?—A. Martin McNamara was one, and a man by the name of Palmer; I don't recollect his first name; Thomas was another. Those were all, I think, that worked any overtime, or that received any pay at all.

Q. That is all you can remember of the inspectors?—A. All that I know of; yes, sir.

Q. Who received anything under fictitious titles?—A. Yes, sir.

Q. What did you understand this money to be for that was in these envelopes addressed to those fictitious persons?—A. It was for overtime; any time that was worked after 5 o'clock.

Q. Did you understand that these inspectors were entitled to that money from somebody for working beyond their hours?—A. No, sir; I never thought they were entitled to it.

Q. You took these envelopes for these fictitious people yourself from Heitmuller?—A. Yes, sir; generally.

Q. And you delivered these envelopes to the people for whom you understood they were intended?—A. I did.

Q. Did you open the envelopes to see how much money you gave to each one of those persons?—A. No, sir.

Q. Was the amount of money that purported to be in the envelope marked on the outside in any way?—A. Yes, sir; it always was, I think.

Q. On all these envelopes, for laborers and everybody else?—A. Yes, sir; they were always marked on the outside.

Q. There was a mark showing the dollars and cents, showing how much it was supposed there was inside?—A. Yes, sir.

Q. Were these fictitious names that you have described as having relation to the inspectors the only fictitious names that were borne on the books or borne on envelopes?—A. I don't think I quite get the question.

Q. My question is whether there were any other fictitious names of persons whose names were put on any envelopes besides those you have already mentioned?—A. No, sir; none that I know of.

Q. Do you know of any person or persons who purported to be laborers and who were not there working, and for whom envelopes or other method of payment were devised?—A. No, sir; I don't remember any.

Q. Are you quite sure about that?—A. Not to my recollection.

Q. I understand you to mean, then, that as positively as you can now state, in a rather mysterious transaction that only occurred this last summer, you have named all the fictitious entries, or directions, or addresses that you know of?—A. Yes, sir.

Q. Not merely as applied to these four inspectors, but as applied to anybody else?—A. That is all that I know of, sir.

Q. You say Mr. Leroy devised these false names?—A. No, sir; not Mr. Leroy; it was Mr. Heitmuller, the time-keeper.

Q. When did he devise them?—A. The very first occasion.

Q. Did he confer with you about it?—A. Yes, sir.

Q. What did he say?—A. Well, sir, it is my understanding that he said——

Q. I mean what did he say to you?—A. That is what I am trying to give you. It is my understanding that he said that it had been the custom to pay those men for extra time in that way, under an assumed name.

Q. You mean the custom under the former contract?—A. Yes, sir.

. Did he say anything else?—A. No, sir; not that I know of; no
e than he would give them the names that they would be paid under.
. What did you say?
he WITNESS. In reference to this?
he CHAIRMAN. Yes; when Heitmuller told you, what did you say?—
I don't remember what remark I made about it.
. Do you remember that you made any remark?—A. I think I ob-
ed; that I said I didn't think that was the proper way; that if they
e to be paid they should be paid under their own names.
. That is your recollection, is it?—A. That is my recollection; yes,

. Did Heitmuller succeed in convincing you that his was a good way
o, or did you succeed in convincing him that it was a bad way to
—A. There was nothing more said about it that I remember.
. And you took the envelopes?—A. Yes, sir; I took the envelopes.
. And delivered them according to the contrivance that had been
nged?—A. Delivered to those men that he told me they were to
o.
. Can you remember how much money was marked on the backs of
of these envelopes as being inside?—A. No, sir; I don't think I
d.
. The envelopes were sealed, I suppose?—A. The envelopes were
ed; yes, sir.
. You can not remember any instance where the number of dollars
mentioned on the outside?—A. No, sir. I can, too, in one case,
case of Mr. O'Brien. Mr. O'Brien received $6; that is, a dollar for
day.
. What make you remember that?—A. Because there was an under-
ding with Mr. O'Brien before he went into the tunnel.
. What was the occasion of keeping it in a fictitious name if it was
ntract made with O'Brien for him to have a dollar a day?—A. Sim-
because they were all kept that way, I presume.
. What was the purpose of keeping them that way?—A. That I
r understood, unless it was the wishes of the inspectors, but never
of them expressed themselves to me in that way.
. You have expressed yourself as having had considerable experi-
with men, carrying on important business as inspector and man-
of this reservoir and all that; did you not know that that, on the
of it, was some evidence of a corrupt arrangement of some sort?—
Yes, sir; I felt that it was.
. And that it really was a means of carrying on a transaction that,
nown and made public, would be disreputable?—A. Yes, sir; I
dn't look on it in any other light.
. And still you went on with it?—A. Yes, sir.
. And you, yourself, through the whole summer and up to the end,
ppose, were helping to carry on that transaction?—A. Yes, sir; it
carried on all through.
. And that money that was wrapped in these envelopes and deliv-
by you to those men came out of money you were receiving from
swith & Quackenbush on a contract, did it not?—A. Yes, sir.
. So that all the money that was thus paid under these fictitious
es was really taken out of your earnings in the work?—A. Yes,
they were all right on the face of the pay-rolls, just the same as
other men. The entire pay-roll was charged up to us.
. I think you mentioned four false names, did you not?—A. No,
there were four false names, but I don't remember the fourth one.

Q. What day do you say you began this work this last summer?—A. I think on the 15th of May.

Q. And you had Rock Creek, both east and west?—A. Yes, sir.

Q. (Referring to time-books.) Are you certain that the fictitious Smith was not Ed. Smith, instead of John?—A. I am satisfied it was not.

Q. Do you remember Ed. Smith, a laborer?—A. No, sir.

Q. I see here at one place in this time-book, for Champlain avenue east, P. F. Brennan is charged with $25. Now, if this secrecy was wanted, Brennan's name could have been put in for $25, could it not without him being there?—A. It could not have been that way unless I had known it.

Q. That was in your work, Champlain avenue east?—A. Yes, sir. He might have been there, but I was under the impression that he was not there as long as it is stated there in that book.

Q. Foundry Branch would be the place where Brennan would be properly found, would it not?—A. Yes, sir.

Q. If it should appear that Brennan appeared as having been at work at two places the same week, and is put down in the time-book as having been paid at both places, that would be irregular, would it not?—A. Yes, sir; it would.

Q. And it would give just grounds to suspect that those entries were made for some other purpose than to pay Brennan, would it not?—A. Yes, sir; it would.

Q. I see under the heading of Rock Creek east the name of John Smith, packer; was that a fictitious name?—A. John Smith was the name.

Q. Can you now remember who was the inspector that John Smith was intended to represent?—A. I am under the impression that it was intended to represent McNamara. McNamara was most of the time in Rock Creek shaft; he was at Champlain avenue a short time.

Q. John Smith, the packer, is charged with $5. How did the boy Lucas come to be discharged?—A. I discharged him.

Q. What for?—A. There had been complaints made about him being impudent; Mr. Kirlin said that the men complained and charged that the boy jumped off and on the cages, and that was another reason; and I felt that Mr. Lucas regarded it as a bribe, from the fact that he said the boy was not getting pay enough considering the service he had rendered me.

Q. How did you come to employ this boy?—A. Through Mr. Lucas.

Q. Lucas asked you to?—A. Yes, sir; and insisted upon it.

Q. What took place between you and Lucas in regard to the boy's behavior after he came there, or about his going away?—A. Mr. Lucas asked why I had dismissed him, and I told him for several reasons, and gave him one, that he was impudent to the men, the men having reported to me, through Mr. Kirlin, chief inspector, about his jumping on and off the cages, and being liable to get hurt. However, Mr. Lucas assumed all the dangers of his getting hurt when the boy first went to work. I objected to him going to work on that ground, that he was liable to get hurt.

Q. Have you told all that took place between you and Lucas in regard to the boy going away, and in regard to the whole matter?—A. No, sir.

Q. Then tell it all.—A. When I gave Mr. Lucas the reasons for putting the boy off, he then remarked that he intended to squeeze me or pinch me, I don't remember which of those expressions.

Q. What did he mean by that?—A. I took it that he intended to hold his lines very strictly on me with reference to inspection; and I replied to him that he understood the specifications, and if I caught any work in the tunnel that was not good I would report to him.

Q. Before that conversation had you seen or heard of any bad work?—A. No, sir; not in my work. I had heard it rumored that there was careless work done before I had anything to do with the tunnel.

Q. I mean in regard to the work that was going on that summer under this last contract?—A. No, sir.

Q. Had not Kirlin mentioned to you that Lucas had discovered or professed to have discovered that some bad work had very recently been done, and a good deal of it?—A. No, sir. I could explain that Mr. Lucas thought that the night work that was being done was not being done properly, and I asked him to give me an order to have it taken out, or to report it to some one who could give me an order to have it taken out.

Q. Was that before or after your conversation with Lucas about the boy, Lucas saying that he would make you squeal, or squeeze you, or some expression to that effect?—A. I really don't recollect; I think, however, it was after the boy was discharged.

Q. Do you remember an occasion, just about the time that the boy was discharged—I do not mean the same day necessarily—when you and Kirlin and Lucas were all together down there at the work at one of the shafts, I have forgotten which one, either Rock Creek or Champlain avenue, and some conversation passed in regard to bad work?—A. No, sir; I don't remember of any conversation between the three of us.

Q. Do you remember the event of you three being together there about that time in some part of the work when some bad work was said to have been done?—A. No, sir; I don't.

Q. Do you remember walking off from the place where the work was going on with Mr. Kirlin, after having had some conversation on the subject of the work, some distance from where the men were at work and leaving Lucas behind?—A. No, sir; I don't remember it.

Q. Do you remember any occasion when you and Lucas were together at the work some morning when you walked off in the direction of a shaft and you met Kirlin and came back to where Lucas was?—A. I don't remember coming back. I remember meeting Mr. Kirlin, after remonstrating with Mr. Lucas about making this statement outside of the tunnel, before he went down in the morning. There were a great many people standing there talking, and he expressed himself as believing that the work was not done properly. I then asked him not to make those statements openly, but to either order the work taken out or to report it to Mr. Kirlin or Lieutenant Townsend, and do it at once.

Q. Where was that?—A. That was in the tunnel.

Q. I understood you to say that you recollected meeting Kirlin outside when he was coming down?—A. Yes, sir; I met him in the tunnel as I was going west.

Q. After you had had this conversation with Lucas?—A. Yes, sir.

Q. And saying to him what you have stated. What did Kirlin say?—A. I stated to Mr. Kirlin what I had stated to Mr. Lucas, and also about his making the statement on top, that the work was not properly done during the night, and what I had said to him in reference to having the work overhauled or taken out to satisfy ourselves whether the work was good.

Q. What did Kirlin say when you told him that?—A. He said he would see him and talk to him about it.

Q. Did you and Kirlin have any conversation as to the extent of this bad work that was then referred to?—A. No, sir.

Q. Did Kirlin say anything to you about investigating and having it taken down?—A. No, sir.

Q. Was it taken down?—A. No, sir.

Q. Where was that particular bad work then spoken of?—A. At that particular time, I judge, it was at about from station 400 to station 600, probably.

Q. Which shaft?—A. Champlain avenue east.

Q. Why was it not taken out?—A. I don't know.

Q. Did you believe it to be bad?—A. No, sir.

Q. You thought it was good?—A. I did.

Q. What distance had been done that night? You have spoken of it as night work, I believe.—A. That I couldn't say.

Q. You knew at the time?—A. Oh, I knew at the time; yes, sir.

Q. How many men were employed there at that time on the night shift?—A. I don't remember; the night gangs varied very much according to the amount of work that had to be done at night.

Q. Did you go and try to make any inspection yourself as to this alleged bad work?—A. No, sir.

Q. Did you make any inquiry of your foreman about it?—A. No, sir.

Q. Why not?—A. I supposed that if it was necessary to open it the inspectors would give us an order to do it.

Q. But you have stated that your contract was to do the work thoroughly and completely according to the specifications or according to the requirements of the engineers, etc.; and you knew, if I have correctly understood you before, that the packing was to be of rubble masonry solid packing, and that you were bound by your contract to do that thing, pack it solidly, to the satisfaction of the engineers. So that apparently two things would be required of you: first, that you should absolutely pack it solidly, in substance; and secondly, that you should do that solid packing in such a manner as to satisfy the engineers that the solid packing was of suitable material, etc.; and being bound by your contract to do that thing, how could it happen that your attention being called right in the midst of the work to these alleged gross irregularities, you still did not even go to look or make any inquiry about it?—A. I did not have any confidence in Mr. Lucas's statement; I felt, from the way he had talked previously, that it was a malicious matter between himself and the night inspector, or between himself and me.

Q. If you thought that, and were so sensitive about Lucas talking about it outside among men, why did you not go and inspect and satisfy yourself that it was all right, and thus finish out Lucas once for all as being a spreader of false reports?—A. Well, sir, I didn't think I was called upon to do it.

Q. And yet you knew that it was not right, and it would be a breach of your contract?—A. Well, I knew that it would not be according to my wishes if it was not done right.

Q. You knew it would be a breach of your contract, and would hold you to pecuniary responsibility, did you not?—A. No, sir; I didn't look at it in that light.

Q. You did not think your contract required you to fill up the space outside of the mason work, then?—A. There was nothing in my contract that spoke of that, but I wish to confess that I did know that it was to be done that way.

Q. Then, if you knew that it was to be done that way how could you

see that you would be involved in pecuniary responsibility if it
ot done that way?—A. I never gave it any thought.
Referring on the time-book to Champlain avenue east for week
; June 15, 1888.) Do you remember the name of John C. Burke?—
lon't remember him.
CHAIRMAN. I see that this name of John C. Burke has a check
following it, like the check-marks that have appeared in several
against the names that you say are fictitious.
Can you recollect that name in connection with one of these ficti-
names on the envelopes that you could not remember?—A. No,
ot the name of Burke.
I see here for the week ending Friday, June 15, Champlain avenue
that Brennan appears to have worked all the week and to have
l $30 thereby. Do you remember whether Brennan was there?—
, sir; I do not.
Would he be there in the regular course of business?—A. I hardly
he would be at Champlain avenue; I don't remember of him ever
there more than a day or so in the early part of the work; but he
t Rock Creek when it first started, before we started work at
lry Branch; but after that I don't know that he ever came over
than once or twice in that part of the work.
Who settled the accounts between yourselves and Beckwith &
enbush?—A. Their clerk.
Did you have a clerk?—A. No, sir; we never had a clerk; we
had any settlement with Beckwith & Quackenbush, so far as our
nents have ever gone, except paying check rolls.
Have you ever looked over the accounts or statements between
nd Beckwith & Quackenbush to see what moneys they had
ed you with as paid out by them?—A. No, sir. I just happened
nk of something. There was another inspector by the name of
ward, and his fictitious name was John Woods, I think.
The real name of the inspector was Woodward?—A. Yes, sir.
You handed over these envelopes with the fictitious names to
various inspectors?—A. Yes, sir.
Did you have any conversation with them, or did they say any-
on the subject of these false names?—A. No, sir.
They took the packages and said nothing?—A. They took the
ges and said nothing.
Did you make all the deliveries of the fictitiously addressed en-
es?—A. Not all of them.
Who delivered the others?—A. Mr. Heitmuller delivered some
he was paying off.
Can you recall who "John Smith" was meant for?—A. I am quite
n it was meant for Michael McNamara.
I see John Night got $6 for the week ending June 2, 1888, Cham-
avenue east. Champlain avenue east, week ending June 29,
it appears that John Night, common laborer, and without the
nark, appeared for a full week, $6. Was that a real person, or
me fictitious person?—A. I presume it is the same fictitious name.
Rock Creek west, July 6, 1888, John Smith, cross-mark, packer,
a day; is that the same false name, as you suppose?—A. I pre-
t is.
Rock Creek west, continued, week ending July 6, 1888, John
cross, packer, paid $6; do you understand that to be the same
us person?—A. I don't know why that should occur twice in one

Q. Was there any real John Smith, packer, there at that time?—A I really don't remember; I don't hardly think there was.

Q. Do you remember any John Smith who was a packer?—A. No sir.

Q. Do you remember any John Smith who was employed by you a all?—A. No, sir.

Q. Who was the inspector at Champlain avenue east that summer about the 1st of July?—A. Mr. Woodward and Mr. Lucas, I think were the two inspectors on the day force.

The CHAIRMAN. The first day's entry is apparently for Sunday, and then the next entry begins on Monday, after most all of these entries That is probably how that entry as to John Smith comes to be doubled I see that he got nothing for Sunday in the second entry.

The WITNESS. There was no Sunday work, that I remember.

The CHAIRMAN. It is put down in the Sunday column; and in th first column of July 6, Rock Creek west, there is put in with a pen large S preceding the printed S which stands for Sunday in the regu lar printed heading. That may be for Saturday of the week before, they were paid by the week.

The WITNESS. I would like to explain that.

The CHAIRMAN. Explain it.

The WITNESS. They were paid weekly up until Friday, so that Sa urday's time was not paid for till the week following. Each Saturda they were paid for the previous week, or for that week with the pre vious Saturday.

Q. Champlain avenue east, July 6, 1888, John Night is entered a one day, $1; is that the fictitious Night that you refer to?—A. I pre sume it is.

Q. You think it is, do you not?—A. I do, from the fact that I don remember of any other Night being on the work.

Q. You have not any doubt about it, whatever, in your own mind a all?—A. No, sir.

Q. Champlain avenue, east, the rest of the week, same day, July John Night gets $5; that is the same person?—A. Yes, sir.

Q. At what shaft was Woodward inspector?—A. He was at Cham plain avenue the most of the time.

Q. Where was Lucas at that time?—A. At Champlain avenue.

Q. Both of them?—A. Yes, sir.

Q. Was Woodward the night inspector of that matter referred to be tween you and Lucas where the work was alleged to be bad?—A. No sir; Woodward and Lucas were both day inspectors.

Q. Rock Creek, west, July 13, John Smith, cross-packer, $6; that i the same John Smith we have been speaking of, I suppose?—A. Yes sir.

Q. Champlain avenue, east, July 13, John Night, laborer, six days $6; that is the same Night, I suppose?—A. Yes, sir.

Q. Did Mr. Leroy know about these fictitiously addressed envelopes?— A. Yes, sir.

Q. Who was the person who would count out the money and put into these envelopes and address all of them; for the laborers an all?—A. Mr. Leroy and Mr. Davis, I presume.

Q. Mr. Davis was the book-keeper of Beckwith & Quackenbush, wa he?—A. Yes, sir.

Q. And Leroy was what?—A. He was always regarded as paymaste

Q. Did you make any memorandum or entry in your memorandu

ook, or anywhere else, of these fictitious names, so as to keep them all your recollection?—A. No, sir.

Q. I think you said that you made entries of the names of the other orkmen, did you not?—A. No, sir.

Q. You did not make any such entries?—A. No, sir.

Q. Who was the inspector at Rock Creek, west?—A. McNamara was e inspector there most of the time; he was shifted back and forth metimes.

Q. Rock Creek, west, July 20, John Smith, cross-packer, four days, $6; at is the same John Smith, I suppose?—A. Yes, sir.

Q. Champlain avenue, east, July 20, I see the name of T. K. McNaara; do you remember him?—A. Yes, sir; he was the foreman there.

Q. Your foreman?—A. Yes, sir.

Q. Was he related to Inspector McNamara?—A. Yes, sir.

Q. What relation?—A. They are brothers.

Q. How much did this McNamara, the foreman, get per day?—A. e got $3.

Q. What did he actually do as foreman?—A. He had charge of the ntire men working at that point.

Q. Did he do any manual work himself, except to help around the haft?—A. No, sir; he did not.

Q. Was he a stone-mason by trade?—A. No, sir.

Q. Was he a brick-mason by trade?—A. No, sir; he had been foreman of other work, that is all I ever knew.

Q. On other mason work?—A. Yes, sir; on building conduits, and e was a foreman on the reservoir when I was there.

Q. Champlain avenue, east, same date, John Night again, without a ross, laborer, six days, $6; that is the same John Night, I suppose, ou have been speaking about?—A. I presume so.

Q. Rock Creek, west, July 27, 1888, at the foot of the list appears the ame of John Smith, cross, laborer, five days, $7.50; that is the same ohn Smith, I suppose?—A. I should think so.

Q. Where did this John Wood work that you said was a real stone-nason?—A. He worked mostly in Rock Creek; in fact, altogether, I hink.

Q. I see under Champlain avenue, east, July 27, down near the bottom of the list is Wood, John, with a cross instead of the check-mark of common laborer, as those named above him, and a representation that e worked one-tenth of a day on Saturday, one-tenth of a day on Wednesday, and four tenths of a day on Friday, and received $3, his rate of pay eing $5 a day; do you think that is the real man?—A. No, sir; I hink that would be Inspector Woodward.

Q. I see that on July 27, at Rock Creek, the real John Wood, entered s a brick-mason, worked about the same length of time as all the others id, four and one-half days, and received his rate of $5 a day that same eek. That would make it pretty conclusive, would it not, that the ame John Wood was not working at the same time at Champlain venue and under the head of laborer or under a cross?—A. Yes, sir.

Q. You think this John Wood who appears with a cross, near the foot f Champlain avenue, east, entry for 27th of July, was intended to represent Woodward the inspector?—A. I do.

Q. And O'Brien, you say, was generally inspecting at Howard University?—A. He was the inspector when we were working at Howard niversity early in the day, but he was the night inspector of Champlain avenue.

Q. Did you give O'Brien any of these envelopes addressed to John Night?—A. Yes, sir.

Q. Howard University, July 27, John Night, cross, laborer, four days $6; that is the same John Night, I suppose?—A. Yes, sir.

Q. Champlain avenue, east, August 3, 1888, John Wood, cross, laborer, at the rate of $5 a day, $4.50; that is the same fictitious John Wood that we last referred to, I suppose?—A. Yes, sir.

Q. Howard University, June 3, John Night, cross, common laborer two days, $3; that is the same fictitious John Night, of course?—A. Yes, sir.

Q. In the latter part of the same week, the same John Night appears two days, $3; that is the same one, too, of course?—A. Yes, sir.

Q. Rock Creek, east and west, Friday, August 10, John Smith, cross common laborer, four days, $6; that is the same Smith, I suppose?—A. I think so.

Q. Howard University, August 10, John Night, common laborer, days, $7; is that the same fictitious John Night?—A. I guess it is.

Q. Rock Creek, east and west, August 17, John Smith, cross, common laborer, four days, $6; that is the same fictitious John Smith, is it not?—A. I think so.

Q. Rock Creek, Champlain avenue, Howard University, August 17 John Night, cross, common laborer, four days, $6; that is the same John Night, I suppose, that we have been speaking of before?—A. Yes, sir.

Q. Did you give Lucas regularly, from week to week, these fictitious addressed envelopes?—A. No, sir; I don't think I ever gave Lucas one at all.

Q. Who would have given him those if he had any?—A. The pay master, or Heitmuller, when he would pay him.

Q. Friday, August 17, Champlain avenue east, at the bottom I find apparently a new name—John Stone—with a check mark, $3 paid to him for six-tenths of a day, and carried out $3. Do you know any such man?—A. I think that was a fictitious man. I think that was for Mr. Thomas, inspector of the side walls.

Q. Who gave Thomas his envelopes addressed to John Stone?—A. I think I gave it to him once; I might have done so oftener.

Q. Rock Creek east and west, August 24, John Smith, cross, common laborer, four days, $6. Is that the same fictitious John Smith?—A. I should think so.

Q. Champlain avenue east, August 24, John Night, cross, common laborer, four days, $6; is that the same false name?—A. I should think so; yes.

Q. Champlain avenue east and Rock Creek, Friday, August 24, John Stone, cross, four-tenths of a day, rate 50 cents an hour, $2; is that the same fictitious John Stone that represented Inspector Thomas?—A. Yes sir; the same one.

Q. Rock Creek east and west, August 31, John Smith, cross, common laborer, four days, $6; is that the same fictitious name?—A. Yes, sir.

Q. Champlain avenue east, August 31, John Night, cross, common laborer, four days, $6; that is the same, I suppose?—A. Yes, sir.

Q. Rock Creek east and west, September 7, John Smith, common laborer, four days, $6; that is the same John Smith, I suppose?—A. Yes sir.

Q. Champlain avenue east (R. C., which I suppose meant Rock Creek) September 7, 1888, John Night, cross, common laborer, four days, $6 that is the same John Night, I suppose?—A. Yes, sir.

Q. Rock Creek, east and west, September 14, John Smith, cross, four

, $6; that is the same, I suppose, of course?—A. Yes, sir; I should so.
. Howard University, September 14, John Wood, cross, forty-five ıdredths of a day, at 50 cents an hour, $2.25; that is the same fic- us John Wood, I suppose, representing inspector Woodward?—A. sir.
. Champlain avenue east and Howard University, September 14, ı Night, cross, common laborer, four days, $6; that is the same fic- us John Night, I suppose?—A. Yes, sir.
. Rock Creek, east and west, September 21, John Smith, cross, mon laborer, four days, $6; that is the same, I suppose?—A. Yes,

. Were these ficticious names, which you have given us, all the way ugh for the same persons?—A. Yes, sir.
. Was any change made or any other fictitious names adopted in place of any one of these which you have described?—A. No, sir.
. They represent the same man each time?—A. Yes, sir.
. When did you stop having these fictitious names entered on the -book and these fictitious names on the envelopes with money in ı delivered?—A. I think it was in the latter part of September that ceived orders from Mr. Kirlin that they must not be paid any more.
. And then you stopped?—A. Then it was stopped.
. I see the last entry of any of these fictitious names which you e mentioned appears to be, from a hasty examination—but I think ı right about it—to John Smith on the 21st of September. I do not in this engrossed time-book anything later than that; you think as about that time that it stopped?—A. I think it was.
. How did it happen that there was a sudden stop put to it in that ?—A. Mr. Kirlin, the chief inspector, ordered it stopped.
. Had you any conversation with him about it before this order?— Yes, sir.
. How long before?—A. In the early part of the work.
. What was the conversation in the early part of the work?—A. I d Mr. Kirlin, when I first understood that the inspectors demanded a pay for extra time after 5 o'clock, and he said it had been the rule they had received pay, at least he presumed they had from what ad heard, and he was cognizant of it, and also Lieutenant Townsend

. What else was said in this early part of the work?—A. I think is about all of it. I asked him if there would be any objection to nd he said until they could make some changes in order to do the k at night we would have to work inspectors, and if they had been l before, he saw no reason why they should not be paid now.
. What you mean by "night" is working overtime at the end of the , not a regular night shift?—A. Yes, sir.
. Why did you ask him if there was any objection to it?—A. Be- se I wanted to know where I was going; I objected to paying it at

. With your experience in this world, did you not understand that as a very improper thing for a Government inspector to be receiv- pay under any name or pretense of reality from contractors?—A. I sir.
. Why did you not absolutely refuse to pay and report it to the ef of Engineers, or Secretary of War, or somebody?—A. Well, ator, I became engaged in that work as subcontractor before I w anything about their customs and practices; and having been

idle a long time, it was the only thing I had in view to keep on with that work, and thinking it was their custom, and that the officers in charge were cognizant of it, I felt that there was nothing secret, so far as my connection with it was concerned, because any of these points that I regarded as secret I always mentioned to the chief inspector, Kirlin, whom I have known ever since I was a child, and got his approval..

Q. If you thought there was nothing secret about it, why was it that you were a party to these contrivances of false names and false envelopes intended to be delivered to these people?—A. I have understood all the time that that had been the custom theretofore.

Q. If there was nothing secret about it what was the use of this arrangement?—A. I considered that there was nothing secret about it on my part.

Q. That is, that you knew it?—A. Yes, sir; but I must say that I didn't like the transaction; it didn't look right to me.

Q. You said you thought other points that were secret you talked to Mr. Kirlin about?—A. Anything in reference to the work, yes.

Q. Tell us entirely what kind of secrets there were between you and Mr. Kirlin.—A. I never knew of any secrets.

Q. What do you mean by using the word "secrets"? Just now you spoke of these false names, etc., and said that there was nothing secret about it, and when there was you spoke to Mr. Kirlin privately.—A. I didn't intend to be understood that way.

Q. What other matters of a private nature that you did not want to be made public did you converse with Mr. Kirlin about?—A. I don't know of anything else, except with reference to paying the inspectors for overtime.

Q. That you have said was public; you did not think there was anythink secret about it; did you mean to be understood that you did not think there was anything secret about this method of paying inspectors?—A. No, sir; not in my case, I didn't.

Q. I am speaking of your case. Have you now told us all the instances you recollect, or even have an impression of, of any payments that were made to any inspectors or Government officers in any way?—A. No, sir. I would like to make a statement in one case.

The CHAIRMAN. Yes.

The WITNESS. That is in the case of O'Brien. Mr. O'Brien was foreman on the reservoir when I was inspector there, and also when I was superintendent for Mr. Peterson. When O'Brien received his appointment I was really glad, because I had always taken him to be a perfectly honorable man, and I knew him to be a man of good judgment, and a lively man generally, and complimented him. He said—

I don't want to get in there for $75 a month.

I said—

It has been a custom to pay these inspectors, as I understand, 50 cents an hour for extra time; now, if you will go to Colonel Kirlin or Lieutenant Townsend and ask them if, while in the proper discharge of your duty for them, they have any objections to you keeping the time of my men and regulating them during the night, as I can not be there, I will make the difference to you between $75 and $100 a month.

He went to Mr. Kirlin, as he told me, and asked him if there was any objection, while, if he attended to his duty—this is his statement—he asked Kirlin if there was any objection, if, while he attended to his matters for the Government and saw that the work was put in properly, to his keeping the time of my men and regulating them. And here I would like to explain that, in night-work, sometimes where the jaw of the key

down we can work more men; we put on men enough to close up the
ws of the key, so that there is only the narrow key, and then the men
e dropped off. I wanted him to be satisfied with the character of the
rk and the number of men we had employed, and I felt safe to turn
e men over to him to regulate them, and as he got through with them,
op them off and make a memorandum of them.
Q. Was that before or after you had had the conversation with Kir-
about paying these other inspectors?—A. That was after.
Q. How did you happen to go through with that formality when
u had already been informed by Kirlin that there was no objection
giving inspectors money?—A. I wanted Mr. O'Brien to understand
at he was not being bribed to do any bad work, and, as I told him at
e time and repeatedly afterwards, that it was my wish to have good,
id work done.
Q. Did you pay O'Brien the $25 a month?—A. He was paid $6 a
ek.
Q. The agreement was that he was to have $25 a month, was it not?—
Yes, sir; the difference between $75 and $100, which, of course,
uld be $25 a month.
Q. Did O'Brien come back and report to you what his interview with
rlin had been?—A. Yes, sir.
Q. What did he say?—A. He said that Mr. Kirlin said there would
no objections to the inspectors aiding the work along as rapidly as
y could while they saw that the work was done well for the Govern-
nt.
Q. Did he say that he told Kirlin that you were to pay him, if Kirlin
proved of it or did not object, $25 a month?—A. No, sir; he did not
that he told him.
Q. He did not tell you that he told Kirlin that?—A. No, sir.
Q. Did you ever have any conversation with Mr. Kirlin on the subject
Kirlin's getting some benefit out of this work?—A. No, sir.
Q. Did you ever make any suggestion to him of that kind?—A. No,

Q. In any form?—A. I never did in any way.
Q. Did he ever receive any benefit, to your knowledge, in any way
m it?—A. No, sir; not to my knowledge.
Q. Did anybody else, except what you have now recited to day
e?—A. No, sir; not to my knowledge.
Q. But you say that your accounts with Beckwith & Quackenbush,
o, you have stated, furnished the money under these fictitious names
these purposes, had not yet been settled?—A. They had not.
Q. And you do not yourself know how much money Beckwith &
ackenbush had paid out on your account in respect of overtime, or
eping time, or bribes, or anything else, do you?—A. No, sir, I do
; I haven't any knowledge of that whatever.
Q. What do you now think about the character of that work that
s done under your contract?—A. I think it was very bad work.
Q. When did you begin to discover that—aside from some little oc-
ion when there would be a small defect that might happen anywhere
h men who were trying to do their best—work was being badly
ne?—A. Not until after the statement was made by the Kendalls.
Q. And yet you were the subcontractor for that part of the tunne'
t you have named?—A. Yes, sir.
Q. And should make it your business every day to see the work done,
uld you not?—A. Yes, sir.
Q. And you say that you wished to have it well done?—A. I did, sir.

Q. You had pay enough to do it well, had you not?—A. I thought so; yes.

Q. And yet you did not discover that this systematic—apparently systematic, at least—bad work was running all along?—A. No, sir; I had no idea of it in the world.

Q. No knowledge of it?—A. No knowledge of it.

Q. Whom would it benefit to have this work falsely and badly done?—A. I don't see that it would benefit any one excepting in the saving of cement. I find that the cavities that were left were so small where they were concealed that there would be scarcely any saving to me in the world or to Mr. Quackenbush.

Q. You think there would be no saving in time?—A. No, sir.

Q. You had one hundred men, speaking in general and round numbers, employed in that work, you say?—A. I should judge an average of about that number.

Q. And the average pay of that hundred men would be $150 a day would it not, at least?—A. It would be much more than that, because some of the mechanics were paid from $1.75 to $5 a day.

Q. What do you think the average rate would be?—A. I think the average would be $300 a day; I think there was one time that our check-rolls run weekly up to $1,800 for one week, I believe, and often from $1,400 to $1,800.

Q. Now, if there were vacant spaces enough left to amount to one day's work in the whole of the work that was left undone that would make a saving to you apparently, if it was not found out and you did not have to pay damages for it, of $200, or whatever, would it not, on that theory?—A. Yes; I should think it would.

Q. Beckwith & Quackenbush furnished all the material, did they not?—A. Yes, sir.

Q. And your saving, if there was any, would be on the labor, would it not?—A. Yes, sir.

Q. As you furnished no material?—A. It would if I had only paid the men for what work they had put in.

Q. That is what I mean, if there was any saving?—A. That would be all.

Q. All that inured to your benefit would be the saving for time and for work that was not done?—A. Yes, sir; I would be paid for work that wasn't done.

Q. For I suppose your cross-sections, those of the engineers, and those of Beckwith & Quackenbush's engineers, were all made to include the whole space outside of the brick-work to the rock, were they not?—A. Yes, sir.

Q. And as far as what you call the estimates are concerned—that is, the reports weekly or monthly—you understood those reports of work purporting to be done covered the whole space, did you not?—A. Yes, sir.

Q. How could it be possible that a man of your intelligence and experience in work, and interested in it and desirous to have it well done, could have been there all the time, in a general sense, in charge of the work and watching it, and not even suspected this systematic bad work until a public disclosure was made by a discharged employé?—A. The only reason I can give is that some of the men who were working for me had worked under my inspection and knew that I was very close and rigid, and whenever the question came up as to the character and difficulties of the work I invariably instructed every man to do his work well and thoroughly. But so far as my giving personal attention to it

s concerned, I couldn't possibly do it. I could if I had taken a dif-
ent method of handling my work from what I did, but I tried to han-
my entire work myself, to overlook it, and to keep up an organiza-
n on it; and for that reason I was constantly on the move from one
ce to another, principally in the tunnel. I suppose I would cover
m 6 to 10 miles every day in the tunnel.

Q. And yet in regard to the only instance you have mentioned, where
ne difficulty occurred between you and Lucas, with the knowledge of
rlin, in regard to what Lucas represented to be an important piece of
l work, you did not do anything about it?—A. No, sir; he did not
present it to be a bad piece of work.

Q. What did he represent it to be, then?—A. He said he didn't think
ere could be cement enough going in. But he got his information
m the same source that I did; he got his information from my man
o mixed the cement. He asked him how many barrels of cement went
the tunnel, and the man gave him the same number that he had given
; he asked him about it and he said he didn't know what there was.
aid, "Did Mr. Lucas ever require you to keep account?" He said,
es." I said, "Did you keep account?" He said, "No, sir." I said,
What did you give him a number for?" He said, "I didn't suppose
made any difference, and when I would think about it I would scratch
wn what I thought I had put in."

Q. Who was that man?—A. His name was Henry Worthington; he
xed the cement on top.

Q. Was he a colored man?—A. Yes, sir.

Q. You have used the expression "scratched down." Did that
lored man scratch it down on a piece of paper?—A. No, sir. The
ment was mixed under a shed, and they kept their accounts in vari-
s ways, sometimes on a piece of paper and sometimes on a rafter or
od.

Q. Making a mark?—A. Yes, sir.

Q. So that you believe he had misinformed Lucas in regard to the
antity of cement?—A. Yes, sir; I so stated.

Q. And you knew that if a sufficient quantity of cement did not go
wn to the packing then the packing must be bad, did you not?—
. Yes, sir.

Q. Because you have stated that it required solid cement mortar?—
. Yes, sir.

Q. And this cement that went down for the packing was mixed with
nd when on top, was it not?—A. Yes, sir.

Q. And mixed with a different and unscreened cement from what
ick-masonry cement was?—A. Yes, sir.

Q. Then you must have known, must you not, that if enough cement
d not go down, the consequence must have been that there would be
d work in the packing?—A. Yes, sir.

Q. When you found that a Government inspector had made such a
mpus, as you have described, about that particular instance, and
d inquired of your laborer, and that laborer said that he did not
ep an entirely correct account, but merely mentioned to Lucas the
nount that he had guessed at, why did you not, you being so much in-
rested to do the work well, go and see for yourself whether it was so
not, and whether the packing had been put in properly?

The WITNESS. Tear out the work?

The CHAIRMAN. Yes, or cut a hole in the wall, or tap the wall; any
ay to find out whether there was a hole there, or whether it was solid.

A. I couldn't ascertain unless I should break into the work.

Q. You did not try to ascertain, as I understand you?—A. No, sir.

Q. Was that the only instance where your attention was called to ba work?—A. No, sir. My attention was called by Mr. Kirlin to a ba piece of work in Foundry Branch, and a piece in Rock Creek work.

Q. You were not yourself at Foundry Branch?—A. No, sir.

Q. When was the Rock Creek time?—A. I think that was in June.

Q. Was it before or after this alleged bad work that Lucas and yo had had the conversation about?—A. I think it was some time after.

Q. Under what inspector was that?—A. That was under the nigh inspector.

Q. Who was he?—A. O'Brien. That, I think, was the only night h ever went to Rock Creek to do any work there.

Q. Describe what the mischief was there.—A. There was a hole le unpacked over the key of the arch, I should think about 2 feet square that is, 2 feet high and 2 feet wide, and 8 or 9 feet long, as far as could see, when my attention was called to it.

Q. How did they get at it?—A. It was broken into from the plac where they had built a sham wall.

Q. Built a bulk-head, as they call it?—A. Yes, sir.

Q. And they broke through one bulk-head?—A. Yes, sir.

Q. How far back of the front brick-work was that bulk-head at th time they broke into it?—A. I don't recollect; it was, I think, clos up to the end of the brick-work in the key, but the sides of the brick work extended along.

Q. But the sides of the brick-work would not conceal anything o top while they were open, would they?—A. No, sir.

Q. You think this bulk-head was close up to the key of the arch?—A. Yes, sir.

Q. Were you there when it was broken into?—A. No, sir; I wa there after that.

Q. How long after?—A. I think perhaps an hour after the inspecto had discovered it.

Q. How big a hole was broken in?—A. About the size of the cavity about 2 feet square.

Q How did you look into it? It was very dark there, I suppose.—A. I crawled in as far as I could with a light.

Q. What did you find?—A. I found this hole.

Q. What was there on each side, right and left, extending down the arch?—A. It was thoroughly packed with stone and mortar clear t the arch.

Q. And what was there at the farther end of this hole?—A. Just th same, packed thoroughly with stone and cement.

Q. How did you know that at that farther end there was not anothe bulk-head that concealed what was behind that?—A. I wasn't ther when they decided that it was all right; it was left there in the judg ment of the inspectors.

Q. The farther end of this hole that you went into was all built up with rubble masonry, was it not?—A. Yes, sir; it was so stated by th inspectors.

Q. Did you not see it?—A. I didn't see it when it was taken down.

Q. You crawled in, did you?—A. I crawled in as far as I could see

Q. Through the hole in front of the bulk-head that had been broke down?—A. Yes, sir.

Q. And you have described what size hole it was, and that at th right and left of the arches it was well packed?—A. Yes, sir.

Q. And this hole was right on top, and you have said that at th

rther end of this hole, as you were going in, the work was good?—
Yes, sir; it was apparently good, as well as I could see.

Q. My question is now, how you yourself knew that that farther end at you saw apparently good there was not just another bulk-head ilt like the one that had been broken down at the front?—A. I did t know; I had no means of knowing it, because I wasn't there.

Q. Seeing that fraud committed, did it enter your mind to think hat was possibly at the other end of that hole?—A. Yes, sir; it did ntil the matter was explained by the inspector and the men who were ngaged in packing.

Q. But you did not take interest enough in it to have anybody nock down the next bulk-head, if there was any, to see whether it was lid or not?—A. No, sir; I didn't do that.

Q. Have you now stated all the instances where you had any informaon or suspicion of bad work?—A. I think I have; yes, sir.

Q. How many men were employed at that work where you went into his hole at the time that the fraud was committed?

The WITNESS. During the night?

The CHAIRMAN. Yes.

A. I couldn't say, unless I could refer to something.

Q. You say it was Rock Creek?—A. Yes, sir; it was Rock Creek est.

Q. About what time of the year?—A. Well, it was in June some me; I think I have a note of it somewhere on my book about it.

Q. Have you your book here?—A. No, sir.

The CHAIRMAN. You please bring those books the next time you ome—every scrap of everything you have.

Q. Have you any idea about what part of June it was?—A. No, sir; should think it was toward the last, and possibly it was in July.

Q. (Referring to time-book.) Here is an entry for the week ending une 22, at Rock Creek, where twenty-one men were employed. Was hat Rock Creek east or west?—A. West.

Q. This heading is both east and west; twenty-one men employed oth east and west. Who was the foreman of masons at this Rock Creek west where this hole was?

The WITNESS. At that time?

The CHAIRMAN. Yes.

A. Frank Thompson, a brick-layer, I think, was the man at that ime.

Q. Friday, June 22, Sam. Kendall and then Frank Thompson. Were here only two masons?—A. That is all, I think, at that time; two rick-layers.

Q. And at Rock Creek west and Foundry Branch east Frank Thompson was not there at all. Then Rock Creek east and west, June 29, Frank Thompson was the mason and Theodore Harbech and John Wood—the real John Wood apparently. Were they the people who were employed there when that was done?—A. I should judge they were, from my recollection.

Q. You say Thompson was the foreman?—A. I think so.

Q. And on the 29th of June, Rock Creek east and west, taken together, there were twenty-eight men. Supposing this entry covers both east and west at Rock Creek, how many would be employed at each end. About half?—A. Those gangs generally shifted; when they were not working in east they were working in the west.

Q. Then the whole gang would be shifted over?—A. Yes, sir. The night this bad work occurred was the regular night shift.

Q. And that night foreman?—A. Yes, sir; the brick-mason that was working at night was generally the foreman on the scaffold; the night foreman was William Kendall, and it is my recollection that he was there on that night.

Q. There were a large number of persons employed in that night work, a dozen or fifteen?—A. Yes, sir; I should think there were, perhaps, from a dozen to fifteen; that would be about the night force.

Q. How many men would naturally have known of that sham?—A. Hardly more than one or two men would know about it—the men who were packing it up—because it is a very narrow space to work in.

Q. And you say you never had any suspicion, or anything of the kind, of any bad work except what you have now stated?—A. No, sir; I never had any suspicions of any bad work, only what I saw, those places to which my attention was called.

Q. The instances you have named in your testimony are all the ones where you had any suspicion?—A. I spoke of the one at Foundry Branch and at Rock Creek west and east. There was a small place discovered in Rock Creek east by Colonel Kirlin, right at the end; it wasn't entirely completed, but it was supposed to be completed; at least I supposed it was completed.

Q. Is that all?—A. Yes, sir; that is all.

Q. Did you believe during all this time, when you had made these discoveries that you have described, that the work was still being well done and had been well done?—A. Yes, sir.

Q. You thought it was an accident?—A. Well, I couldn't think it was an accident; I had the word of the men how this occurred in Rock Creek work, the word of the packers.

Q. What did they say as to how it occurred?—A. They said it was on account of a little vein of bad rock that was constantly dropping on them all the time, and they worked on the outside as far as they could reach in and build it up properly; that the brick-layer had finished keying out his work, and the inspector had gone with him to Champlain avenue to do some work there.

Q. What would you say if you knew that in Champlain avenue west, from station 9 to 1080 was now all open from 4 to 6 feet high so that a man, by knocking holes through the bulk-head, could walk through more than 100 feet?—A. I shouldn't be at all surprised.

Q. That was the work that was under your charge?—A. No, sir.

Q. Champlain west?—A. No, sir; I never had anything to do with Champlain west.

Q. Who had to do with that?—A. That was all done when I hadn't anything to do with it.

Q. That was done under Brennan and Emery?—A. Yes, sir.

Q. That was all completed?—A. Yes, sir; all completed, I think, to about 75 or 80 feet from the shaft; there was a great amount of this work that I have had nothing to do with, fortunately.

Q. Was that work in Champlain avenue west that I have just referred to done under the dry-packing contract, or under the wet-packing?—A. Part of both, I think. I never knew anything about this; this was done before last May.

Q. Do you think such work could have gone along in that way without a great many persons, the inspectors, the foremen, and everybody else whose business it was to be there looking after the work, knowing it?—A. I shouldn't think it could. I shouldn't think the work that went on could have gone on without me seeing it.

TESTIMONY OF JOHN M. PALMER—Recalled.

TUESDAY, *December* 11, 1888.

JOHN M. PALMER (recalled).

By the CHAIRMAN:

Q. Have you the papers and estimates that you spoke of, and that memorandum-book?—A. Yes, sir.

The CHAIRMAN. The witness now produces papers purporting to be estimates and check-roll statements of Brennan & Palmer to Beckwith & Quackenbush; also a paper purporting to be a copy of agreement between Brennan & Palmer on the one hand, and Beckwith & Quackenbush on the other, dated May 9, 1888, and purporting on the inside to be dated May 8, instead of 9; for June, 1888, estimate No. 2; check-roll accounts of June 15, June 22, and June 29; July 6, July 13, July 20, July 27; August 3, August 10, August 17, August 24, August 31; statement of account of September 1, 1888; check-roll accounts September 7, September 21, September 28; October 5, October 12, October 19, October 26, 1888.

The WITNESS. There is a weekly statement that I have not been able to find.

The CHAIRMAN. That is, some of the consecutive dates are missing?

The WITNESS. Yes, sir.

The CHAIRMAN. The estimate for June, marked No. 2, is composed of three separate sheets, the first one being part of May and part of June, a kind of summary of moneys paid on check-rolls; the second is a similar thing as to Champlain avenue east; and the third sheet is a continuation of Champlain avenue east, merely giving the totals under various heads. The paper of June 15 appears to be a check-roll of Brennan & Palmer for the week ending that day, and which aggregates all the work done by the various men for that week on Foundry Branch east, Rock Creek west, and Champlain avenue east.

Q. These check-roll summaries, I suppose, have been furnished you by Beckwith & Quackenbush's clerks?—A. Yes, sir.

Q. Wherever these names appear that you have before described as fictitious (as John Smith and John Lucas) do they represent the same sort of fiction that you described before.—A. I think so; yes, sir.

Q. On looking over these papers do you find any other instance than those you named before of fictitious names?—A. No, sir; I do not.

The CHAIRMAN. We will examine these papers that you have produced, and afterwards return them to you, if that is agreeable to you.

The WITNESS. It is.

Q. Have you read the newspaper reports on the testimony of one Tyrrell, as it is spelled in the newspapers, before the military court?—A. Yes, sir.

Q. Were you present when that testimony was given?—A. No, sir.

Q. According to the newspaper report of the testimony of Thomas Terrell, he says that he told you about the bad work. What is your recollection about that?—A. Nothing of the kind.

Q. In Champlain avenue and Rock Creek shaft he says he told you about the bad work.—A. I could state the only thing that was ever said by Terrell to me, except at different times, when he brought messages to me from Lucas to the effect that he was not getting paid, or that his boy was not being paid enough, and that was very soon after we started, I think, when we were turning the first arches of Rock Creek

east. I got upon the scaffold, and he was then acting as foreman. I told him that he should be careful to see that everything was packed up solidly, and he turned around to me and said "Do you expect to pack up above this arch solid?" I said, "I do." He said, "You will get out of here without ever making one cent." I replied that that was my business, but that I wanted him to see while he was there that it was thoroughly packed.

Q. What did he say then?—A. That is all he said. That was the only talk that ever took place between us about the character of the work.

Q. How long did he continue after that as foreman?—A. He was only foreman a very short time. He went with Mr. Brennan to Foundry Branch; I presume he was acting as foreman, but, as Mr. Brennan was entirely in charge there, I didn't think it was necessary to have any foreman.

Q. Which of you two, you and Brennan, in charge of the different parts of the work, made the greatest amount of linear distance of lining a day?—A. I haven't any way of ascertaining that, because we were working in five different places at the same time.

Q. I think you stated before that you were pushing the work as hard as you could, and meant to do so?—A. Yes, sir.

Q. When Terrel left you on that work under your personal charge he went over and worked under Brennan?—A. Yes, sir.

Q. He was not dismissed by you?—A. No, sir; he was discharged by Lieutenant Townsend. I would like to state, that I told Mr. Kirlin, the chief inspector, of my suspicions of him being a careless man or a man that would require watching; and I think I told Mr. Briggs, the inspector there.

Q. Was that while Terrel was under you?—A. No, sir.

Q. Was it after this conversetion that you have described as having had with Terrel?—A. Yes, sir; it was after that.

Q. Why did you not discharge Terrel on the spot, when he suggested to you, as you describe it, that he did not think it ought to be packed in full, and that if it was so packed you could not make anything at all?—A. We were at that time very short of bricklayers; that was my object in sending for the Kendall brothers, and while we were waiting for them he was at work.

Q. Did you watch him while he was working under you?—A. I watched him as far as I could; he was working directly under an inspector.

Q. You stated before, I believe, that it was as much your business as it was that of the inspectors to see that the work was done right; that is what you had undertaken to do?—A. I did not intend to be understood that way.

Q. How do you understand it now?—A. I meant to be understood that I wanted it done that way; that I didn't have time myself to do it. While I was at work there, Mr. Quackenbush said he had instructed the men through the tunnel to look after it and inspect the work, and for that reason, with that inspection, I felt satisfied that the work would be done well, and did not give so much of my attention to it.

Q. I do not think I misunderstood you before, but that perhaps you have misunderstood me now. I inquired if you did not understand that it was as much your duty as it was that of the inspectors to have the work done well?—A. Oh, yes.

Q. That is what by your contract you had undertaken to do?—A. That is what I had undertaken to do yes.

Q. Have you had any difficulty with Terrel since that at any time?—A. After he was discharged he came to me and said we should have to pay him for his time when he was lying idle. I told him he would never get a cent from me for that time. He then said that there had been some crooked work, but that it was previous to my coming into the tunnel. I said if Brennan & Emery was under obligations to pay him they should do it, but he would never get a cent from me, only what he earned on the work.

Q. Did he say where the crooked work had been done before you went in?—A. No, sir.

Q. Did you ask him?—A. No, sir.

Q. Why did you not ask him?—A. I didn't think it interested me to know.

Q. You had no interest or curiosity on that point?—A. No, sir; not anything previous to my own work.

Q. When he was dismissed and you had this conversation with him about his being paid for time when he was lying off in that way, and he hinted in regard to crooked work at a time before you had come in, did you ask him anything about the work that had been done after you came in that he knew about in any way?—A. No, sir; I don't think I did.

Q. Did he hint in this conversation with you, or in any other, that any crooked work took place after you and Brennan became the subcontractors?—A. No, sir.

Q. Did you, at that time, when you had this last conversation with him that you have described, yourself have any suspicion that crooked work had been done in your time?—A. I had an idea after he told me that, that there might possibly be where Mr. Lucas was expected to stay one night, and I subsequently learned that he did not stay, and I reported that to Mr. Kirlin.

Q. What date was Terrell dismissed, as nearly as you can fix it?—A. I think some time in the latter part of June, or possibly in the early part of July; it was very soon after his discharge—I suppose three or four or five days afterward.

Q. In these time-books his name would then cease to appear, I suppose?—A. Yes, sir.

Q. So that we could fix the date by that.—A. Yes, sir; after that date he wouldn't receive anything else, and did not, to my knowledge.

Q. Have you read all the testimony, as it appeared in the newspapers, that was taken before the court of inquiry?—A. I think I have read pretty near all; I don't know that I have read everything.

Q. If there is any further statement in these newspaper reports concerning yourself that you wish to make any remark upon I wish you would do so.—A. Well, sir, there is in regard to statements and affidavits that were made by Mr. Lucas and the Kendall brothers. They said that I was very friendly with the inspectors and sometimes talked for hours with them and kept them away from their work. I wish to say that I don't think I spent over half an hour in any one heading after we got our work started after I first went down, because I couldn't possibly stay there that long, and I don't know that I ever did. I don't know that I ever had any conversation with the inspectors except in relation to the work in some manner. I have affidavits that I wanted to get before the Army board of inquiry, but they didn't think it was necessary to read them.

Q. You were examined there as a witness, were you not?—A. Yes, sir.

Q. Then there would be no use of your affidavits, because it mu be presumed that you stated before them everything that was m terial.—A. This was the affidavit of the inspectors and some of my ov men until I was stopped from taking their affidavits. When the ass tion was made in the newspapers that there was collusion between m self and the inspectors, also that I had instructed my men to do ca less work or had let them do careless work, that I had winked at it took 'Squire Buckey, a justice of the peace in Georgetown, with t intention of going through the entire tunnel and taking the affidav of every man in it. I started at Champlain avenue and took eve man there, with the inspector that was there. When I got to Ro Creek going west I met Mr. Buell, who purported to be Beckwith Quackenbush's consulting engineer, and he stopped me from going a further and taking them.

Q. Whose affidavits did you take?—A. We took the affidavits of m own inspectors; all that I could find at that time.

Q. Name who they were. This related to one part of the tunnel? A. This related to portions of the entire tunnel.

Q. Did it relate to Champlain avenue?—A. Yes, sir.

Q. Both east and west?—A. We did no work in west Champla avenue.

Q. All your work was east?—A. East of Champlain avenue. I thi one was Oscar H. Briggs, who was assistant to Mr. Kirlin and who h charge of the work from Rock Creek to Foundry Branch. Martin M Namara was subinspector at Rock Creek; John P. Rouzee was sub spector at Foundry Branch and Rock Creek; Thomas O'Brien was su inspector at Champlain avenue and at Howard University, both plac George T. Woodward was also at Champlain avenue, and sometimes Howard University. Those are the affidavits, if you wish to see tho and we also took the affidavits of all the gang of men that were at wo in Champlain avenue the day that they were taken.

Q. This paper which you now produce contains the affidavits of the workmen whose affidavits you took?—A. Yes, sir, all the workm I found; the regular gang was there at work.

Q. I see that these affidavits are very much alike. The first one re in this way:

> We, the undersigned inspectors of masonry in the Washington Aqueduct tun wishing to vindicate Mr. Palmer as well as ourselves, desire to make the follow statement:
>
> It has been alleged through the press that Mr. Palmer was in collusion with s of the inspectors to do bad, shoddy work.
>
> Mr. Palmer has never asked us, or in any manner intimated to us, that he wan anything but good work, and has always expressed his wishes to us and to his ployés in our presence that good, substantial work be done in every respect throu out the tunnel.
>
> OSCAR H. BRIGGS,
> *Subinspector, W. A.*
> MARTIN MCNAMARA,
> *Subinspector, W. A.*
> JOHN P. ROWZEE,
> *Subinspector, W. A.*
> THOMAS O'BRIEN.
>
> Sworn to the above this 29th day of September, 1888.
> [SEAL.] M. V. BUCKEY,
> *Justice of the Peac*

Q. What do each of those letters W. A. E. mean after the signat of two of those men?—A. Washington Aqueduct east; they genera signed that way, I believe.

What does that mean? Where would that be?—A. It means the ovement east of the old work.

Covering the whole thing?—A. Oh, yes.

Is this Thomas O'Brien the same inspector O'Brien that has been red to?—A. Yes, sir.

The next one, which is signed by Geo. T. Woodward, is in the e language literally, apparently.—A. Yes, sir; they are duplicates.

r. RYAN. Are they in the same handwritting?

he CHAIRMAN. Yes.

That was drawn up by the magistrate, I suppose?—A. No, sir; I up the original myself, and the man that copied that one copied the r; they were both copied from my handwriting.

And this is the draught that was made from your original draught rm?—A. Yes, sir.

Was this prepared before you took it to the inspectors for signa- and oath?—A. Yes sir.

The third paper is in a little different form, and reads in this way:

ve I ever asked you, or anyone else in your presence, to do anything but good t work, or have I ever asked or required of you more than an honest day's work? wer. No, sir.

GEORGE (his x mark) EDWARD SMITH (packer).
AARON COSLY (brick-layer).
ABRAHAM (his x mark) PRICE (packer).
THOMAS WATTS (mortar mixer).
DANIEL SINS (laborer).
JOHN (his x mark) RIGGS (laborer).
WALTER (his x mark) BAYLOR (laborer).
HENRY (his x mark) WORTHINGTON (laborer).
LAWSON (his x mark) MALLORY (laborer).
EDWARD (his x mark) JOHNSTON (laborer).
WILLIAM (his x mark) THOMAS (laborer).
SAMUEL (his x mark) TERRELL (laborer).
NATHANIEL (his x mark) RAMSEY (mortar mixer).
JOHN (his x mark) BURRILL (mortar mixer).
J. J. GOSHORN (foreman).

rn to the above statement this 27th day of September, 1888.
AL.] M. V. BUCKEY,
Justice of the Peace.

Was Woodward examined before the military court of inquiry?—o, sir; I don't think he was.

Briggs was, was he not?—A. Yes, sir.

Was McNamara examined?—A. Yes, sir.

Was Rouzee?—A. Yes, sir.

O'Brien?—A. Yes, sir.

Goshorn?—A. No, sir.

Where is Goshorn?—A. He is at my house; he is suffering with monia now.

Were any of these packers, brick-layers, etc., named in this last r, examined before the military court of inquiry?—A. No, sir; I think they were. I asked to have some of them examined. I ed proof by some of those men that there was as much precaution nceal the work from me as there was from the inspectors.

Who do you think took the precaution to conceal it from you?—he brick-layers, some of the men have stated since. They have d me to be allowed to make a statement.

What was the motive to cause them to conceal the bad work from ? What had they to gain from bad work?—A. That I can't under- d. Since the work has been opened, I would like to state that I have

seen the old work that was done before, and have come to the conc sion that it was natural meanness on the part of the workmen in ord to save their work, so they could loaf, that caused them to do this has work and get pay for it the same as though they were doing it solid, a at the same time not working half the time.

Q. Did they get the same pay for bad work that they would get good work?—A. Yes, sir.

Q. They were paid by the day, were they not?—A. Yes, sir.

Q. Was there anything understood with regard to their having an thing extra if they made a certain amount of progress?—A. No, s never to my knowledge.

Q. You never paid any money for any such purpose?—A. No, sir.

Q. There was no premium for diligence or anything of that sort A. No, sir; I never paid a cent for that purpose.

Q. Is there any other statement in the testimony before the milita court affecting you that you wish to make any remark about?—A would like to deny every statement that was made there implicati me in any desire or having given order to do bad work. There w nothing of the kind. I don't know that I have ever seen where the was direct charges made, but they were all calculated to form an i pression that I was cognizant of it.

Q. Can you recall any particular instance where any testimony tak before the court of inquiry appeared to show that you were present a saw bad work or knew about it, or where there was anything said abo it that you wish to refer to now further than you have? You ha already spoken of Terrell.—A. I think of one point now; it was sta that I went into the tunnel at Howard University, and Mr. O'Brien, t inspector, was absent, and another inspector was there, and that I w dissatisfied with the amount of work done, and said there would more work done to-morrow with a less number of men. That I de I never made any such statement and was never dissatisfied with work that I know of.

Q. You were satisfied all the time, then, were you?—A. Yes, sir was satisfied that they were doing a reasonable amount of work, u after this investigation began. Then I was dissatisfied with some the work.

Q. During the time the work was going on was there never any ti when you suspected or thought about the question whether as mu progress in distance in a given day, or night, or week, could have be made and have had the packing absolutely done solidly in mortar the same time?—A. No, sir; there has never been a foot more do than I considered could be done with reason.

Q. Were there ever any times when it would appear at the end o week that a great deal more progress had been made in distance th there had been in some other week in some other part of the work A. No, sir; I didn't notice it.

Q. The progress was uniform?—A. The progress was uniform u the tunnel was enlarged, and then it required more material, and c sequently the progress was slower. In some places there were th courses of brick and in some places four courses, where generally th had been only two, and so, of course, it required more material took a longer time to put in three or four courses than to put in t They could only work about so many men.

Q. I see O'Brien says that you made a proposition to him that should become time-keeper and he should receive pay for it.—A. N sir.

Q. Did you ever have any conversation with anybody there in connection with your work as to the amount of work they had to do in a day?—A. Yes, sir; I think I have.

Q. How many centers do you think they ought to have done in a day?—A. I think I have been asked that question and given my opinion. I calculate that three bricklayers ought to have finished two centers, which would be 28 feet; that is to say, two bricklayers in a day and one at night would lay 2,400 brick, and the key would be laid by the night bricklayer, and the amount of work he did would be very small; in fact, the night bricklayer had to work not more than half his time.

Q. By night bricklayer do you mean a bricklayer working far into the night, or only working an hour or so overtime after the regular day's work?—A. I speak of the regular night force.

Q. You thought they ought to finish two centers a day?—A. Yes, sir. If the night bricklayer did his work according to the instructions that the inspectors had to see that it was done well, he could only lay up about 2 feet unless the packing was very heavy; if it was very heavy he could run 4 feet 8 inches, or what we call a bay, the space between the ribs, and then he had to stop until the packers packed that work.

Q. What is the length of a center?—A. Fourteen feet.

Q. But you thought they ought to make 28 feet in a day and night, including the keying up at night?—A. Yes, sir; including the ordinary excavation.

Q. Are you sure it was not three centers that they ought to do?—A. I am satisfied that it was not three centers unless there were three bricklayers to work. I calculated a center to the man in the day, and the night bricklayers to key them up.

Q. Was one Frank B. Thompson a foreman under you at one time there?—A. Yes, sir.

Q. When was he employed—when you began?—A. No, sir; not at first; I think he was employed in the early part of June or late in May.

Q. How long did he stay?—A. My recollection is that he stayed about five or six weeks.

Q. How did he happen to leave?—A. He quit; but he would have been discharged for negligence generally; negligence in looking after his work and his men.

Q. What was the particular negligence?—A. The particular negligence I found was the careless manner in which he allowed bricks to be laid. While they were thoroughly bonded and well bedded in mortar, they were not laid as clean as they ought to have been; and I would like to say that I called his attention to it two or three times; he replied that he couldn't help it; that the bricklayers wouldn't lay them that way. I asked him if they had plenty of time, and he said they had plenty of time to lay them perfectly true. Then he was very careless about handling the work generally, and I scolded him a couple of times about that.

Q. Handling in what respect?—A. About working his men advantageously, both above and below the scaffolds.

Q. Did you ever find any fault with him in respect to the packing part of the work?—A. No, sir.

Q. He had charge of that, had he not?—A. Oh, yes; he had charge, while he was there, of everything.

Q. How often were you in, seeing this improper brick-laying going on?—A. That I would notice in passing through after the centers were struck; there wasn't a day when I wasn't in the work.

Q. You would see it yourself on the interior face of the wall?—
Invariably; yes, sir; and I would call the bricklayers' and inspect
attention to it.

Q. Was it taken down and straightened up?—A. No, sir; it wa
really any detriment to the work, except it didn't look finished in a w
manlike manner. The bricks were well bonded and well mortared.

Q. You knew, I suppose, that the more irregular the interior fac
the tunnel was the more would be the friction of the water and the
water it would carry?—A. The bricks were all supposed to be
right down to the lagging over the center, but the joints were not t
The bricks would, perhaps, be tipping a little at one end; it wasn'
handsome piece of brick-work, though it was as good as I see anywh
about this building. The joints were, ordinarily, as good as the jo
I see anywhere about this building. That would give you an ide
about how the work was.

Q. But the packing was the only thing that in the time of it
never had any occasion to find fault about?—A. No, sir; I don't k
that I ever got any bad packing. I have frequently cautioned both
men and the inspectors about it. If I should go into the tunnel
find that there was a scarcity of cement, or anything like that, I w
immediately order the inspectors to see to it that there was no work w
on till the cement came in. Sometimes, owing to some of the cars be
off the track, or something of that kind, they would be delayed with
cement.

Q. Do you think of any other instances, in this testimony, taken
fore the military court of inquiry, as reported in the newspapers, in
gard to which you wish to make any contradiction?—A. I pres
there is, if I could remember what they were.

Q. You can not remember any now?—A. No more than what I h
stated, I believe.

By Mr. RYAN:

Q. What was the object of your getting the affidavits of those
under the circumstances?—A. I intended to have them published
didn't think I ought to remain quiet and have those charges m
against me. I intended to have them published, and I also tried to
them before the Army board, but they said there was no charges aga
me, and they were not trying me, and thought it wasn't necessar
look at them. They did examine the inspectors, but I don't think
have ever examined Woodward.

Mr. Chairman, here is this memorandum book that I promised
other day to leave with you. I almost forgot it.

By the CHAIRMAN:

Q. This memorandum book appears evidently to have been pri
for use as a time-book?—A. Yes, sir.

Q. And it appears generally to have had the names of men who
at work there; I suppose they were men under your charge?—A.
sir; not the entire number of men, by any means, that worked for
but just men that I would take note of at different workings; pri
pally men that I would move from one place to another.

Q. Have you on this memorandum book any of the names of t
fictitious representatives that you have spoken of?—A. No, sir; I n
had one of them written down.

Q. Your work at Foundry branch was in 1886, was it?—A. Yes,
my work there was in 1886–'87.

Q. I see under the head of Foundry Branch, and under the dat

27, this entry: "Men all suspended on account of bad packing." ou remember anything about that?—A. Yes, sir; that was the ion I spoke of the other day when I was testifying. That was the hat the bad work in Foundry Branch was discovered, also the hat Terrell was discharged.

I see on another page, written at the top, these words: "From 30 to July 7, Foundry Branch arch, 366 to 394, equal to 28 feet;" comes the entry of "Rock Creek east, from 258 to 356, equals 98 Then on the opposite page, between the same lines, "Owing to packing 20 feet was removed July 9 and 10."—A. That was pack- n Rock Creek west.

That is one instance. This says Rock Creek east.—A. The bad ing is Rock Creek west, isn't it?

I do not know; I am merely asking you about what it says here. ds here, "Rock Creek east." That is plainly "east," is it not?— es, sir; but that has no reference to this [pointing]. This is the nt of work done weekly.

What has that reference to [pointing]?—A. That has reference to work done in Rock Creek west, of which I spoke last Friday.

That was the same bad work you spoke of when you were on the l before?—A. Yes, sir. It took three days to ravel it out and re- it.

I see there are three leaves here a little past the middle of this orandum book, two of them having been torn out entirely, and one y; do you know anything about that?—A. I presume they were out to write on; I frequently did that; I carried the book more hat purpose than anything else.

Do you remember anything about it?—A. I don't remember any- about it. I say that is what I carried the book for more than hing else.

You have no recollection, except in general, that you might have it out to do some writing on?—A. That is what I presume they torn out for.

There are also two more that are torn a little before those I have ioned, and then two others still earlier, and still earlier than that is one more.—A. I might say that there was nothing written on torn-out leaves that was intended to remain in the book. They just simply torn out when I wanted to send a note to somebody.

You have no special recollection on the subject as to any particu- stance?—A. No, sir.

I see on another page these entries: "F. B." (that means Foundry ch, I suppose), "F. B. east, station 600 plus 20 to station 775 plus nd then on the next page following, "muck above grade," and on the first page is written—

work has been cross-sectioned by Mr. Clark over this eastern space, and at muck is 14 inches above grade; so says Mr. Briggs, inspector, August 11.

you remember anything about that?—A. Yes, sir. That was a ion of Mr. Clark's cross-sectioning, taking the cross-sections above in a very careless manner. We objected to that to Beckwith & kenbush.

What did you do in that distance of 175 feet, in round numbers, e the bottom was above grade?—A. The cross-sections were taken e they were cleaned out, mucked out, whereas the cross-sections t not to have been taken until the foundations were thoroughly ed and ready to put the work in.

Q. Were they not cleaned before you put in the work?—A. Yes, sir in every instance, so far as I ever knew, but we looked more particularly to the foundations than anything else.

Q. Did you ever know of any of this muck, as it is called, being used for filling?—A. No, sir.

Q. You never heard of anything of that sort?—A. No, sir; I never heard it except in this man Terrell's statement.

Q. That is the first you ever heard of it?—A. Yes, sir. I understand that was in Champlain avenue west.

TESTIMONY OF JACOB B. MASTERS.

TUESDAY, *Dec.* 11, 1888.

JACOB B. MASTERS, sworn and examined.

By the CHAIRMAN:

Q. What is your age?—A. Sixty-six years.

Q. What is your occupation?—A. Well, I have been superintendent and boss for the Chesapeake and Ohio Canal for about the last twenty or twenty-two years before I came to Washington.

Q. Were you ever employed on any public work?—A. That was public work.

Q. Any public work of the United States?—A. No, sir.

Q. Have you been employed in any capacity in connection with the Washington Aqueduct tunnel?—A. Yes, sir; that was in 1887.

Q. When were you first employed?—A. Well, I began to work in the first week in March, 1887.

Q. Who employed you?—A. I suppose Major Lydecker did.

Q. What were you employed to do?—A. To inspect.

Q. Inspect what?—A. To inspect the masonry and the work that was to be done in preparation for masonry, and so on.

Q. Were you employed to inspect the packing as well as the masonry?—A. Yes, sir.

Q. What part of the tunnel did you begin work upon as inspector?—A. Well, it was east of Rock Creek; what is called Rock Creek east.

Q. Who was in charge of the work for the contractors at that time

The WITNESS. Do you mean the boss?

The CHAIRMAN. Yes; I mean, who was the contractor first.

A. Mr. Emery was the only one I knew.

Q. And who was the boss mason?—A. It was a gentleman named John Kirlin. I don't know whether his name was John or not.

Q. Do you know at what station you began in Rock Creek east?—A. I do not.

Q. Did you make any daily report?—A. Only the number of men that we had at work.

Q. To whom did you report?—A. I reported up into the office; made out a list.

Q. What office?—A. The little office that is at Rock Creek shaft.

Q. Who was present, in the office, to whom you reported?—A. I just left it there when I came out; I was on a night shift all the time.

Q. Who had charge of the office when you left it there?—A. No one had charge of it; it was an open office.

Q. Do you know whose office it was?—A. They said it belonged to the Government.

Q. Did you see any Government engineer there at that office?—A.

ver saw anybody there. I always went in at night and came out at o'clock in the morning.

Q. What did you do with your report?—A. Just stuck it on a little re that hung there, and if I had anything to say there was a little ok that I wrote it in.

Q. Were you in the tunnel every night during that period?—A. Yes, r.

Q. All night long?—A. Yes, sir; all night long.

Q. How many men were employed at the time you were inspector at ght?—A. From eleven to thirteen, I suppose, on an average.

Q. Which way were they working, towards the east or the west?—A. ey worked both ways; they commenced about the middle and worked rt of the time east, and then they would finish the east and then go ck to the west.

Q. The same gang of men?—A. The same gang of men, from one de to the other; and then after they would work a while in the west ey would go east again and finish up to the next section.

Q. Who were the packers during that time?—A. I don't know that know their right names. There was Bob Connor, or some such name that, and the other one was a black man.

Q. How far from where the shaft came down to the tunnel were you work?—A. I suppose it was about half a mile, maybe more. At st I went east, and then about June, I think it was, we changed to e west.

Q. That is, you went west from the shaft in June?—A. Yes, sir.

Q. How much altogether, in length, do you think was done east under our inspection?—A. I commenced in March and worked until June; hardly know; I don't believe I could say how much was done.

Q. How long did you work there in Rock Creek east?

The WITNESS. How long.

The CHAIRMAN. How long.

A. From March until, I think, in June; I think it was in June when e came away.

Q. That would be three months or so?—A. Yes, sir; that would be ree months.

Q. Can you not form some kind of an estimate as to the length of ing that had been put in during that time?—A. I don't know that I uld. Part of this work was done when I went there; that is, part of e space was built up, and we built a certain amount east and a certain nount west, and putting all together I couldn't hardly say how much was. There was part of it done before I went there.

Q. During that time, while you were in Rock Creek east, did you see y bad work done?—A. Well, I suppose that I seen some bad work ne, sir.

Q. What makes you think so?—A. Well, sometimes I would find em doing bad work and I would have it done over again if I could.

Q. If you could?—A. I mean if I knew it in time. It would be a tle place, not anything serious; but I didn't agree to the way they ere doing it.

Q. Was all the bad work that you saw removed and made right?—. I think so; yes, as far as I knew.

Q. Did you report these instances of bad work to your superior?—. No, sir; I don't know that I did; I didn't see any superior.

Q. Who was the chief inspector?—A. Colonel Kirlin.

Q. Did you not see him?—A. I seen him once or twice in the two or ree months; perhaps I would see him some place in the day-time, and

I went in at 7 o'clock in the evening and came out at 5 o'clock in morning, and until 12 or 1 or along there in the day I would have sleep, and then in the afternoon I didn't have any more time.

Q. And during all that time you didn't make any report to Col Kirlin of how the work was going along at all?—A. No, sir; the da spector was Mr. Samuel C. Boyce, I think his name is; and any ti would have any little trouble I would write it on a little note and him about it—about any little matter that way, and he would ta that way. Sometimes we would meet in the evening and he woul coming out and I would be there to go in.

Q. Putting it all together, in the three months that you were in t how many instances do you think you observed of bad work?— don't know about the bad work, mister; I would go from one pla another, you know; we had the invert to put in.

Q. I was not asking you to explain; I was asking you to tell m far as you can remember, during all that time that you were t every working night in Rock Creek east, how many instances of work do you think you observed?—A. Well, I would have a trouble almost every night, sir.

Q. What would be the nature of that trouble?—A. They woul putting in stone carelessly, and I would be off to one point, you k and come back and see that they hadn't put the stone right, as reg the cement, etc., and I would say to them "why don't you lay the s this way, or that way, and make it all solid," as I expected them t it.

Q. How was the packing desired to be done under your instructio A. Part of it was put in pretty solid and laid in cement.

Q. Did you know how much cement came down to go into this p ing?—A. I didn't know any particular amount; no, sir.

Q. How large was the largest place that you can remember abov mason-work and around it before the packing work was put in? Well, we had no very large places; sometimes there would be pl 3 or 4 feet up above and around.

Q. How wide would these places be that were 3 or 4 feet high? Sometimes before we got up to the top there would be a space 4, 6 feet high; that was the case in some few places.

Q. Where was this bad work that you discovered almost e night?—A. Everywhere; all along the work. I was going to say a the bottom——

Q. You need not go to the bottom yet. What would the packer when you told them that that work would not do and that they do it over again?—A. They would do it, you know.

Q. What would they say to you when you would speak to them a it?—A. They wouldn't say. Sometimes a packer would say he d take notice of it or something of that kind.

Q. Was that all he said?—A. Yes, sir; pretty much all he sai would be away attending to the laying of stone off in a point over t and he would say he didn't notice it, or something of that kind.

Q. Did you ever discover in that time in Rock Creek east an cant spaces that they had left unfilled?—A. No, sir; I think not.

Q. You did not?—A. No, sir. When I went in there the day- was there for me to commence upon, and I finished his work that unfinished, and I suppose he finished up my work that I had left finished. When the day's work was done we left off at certain pl and I always commenced where Mr. Boyce left off. Sometimes work wasn't finished up to the top of the brick arch. Wherever

pped on one side the brick-masons would be ready, and that work uld be for me to finish up when I would get there, and my work uld be for him to finish when he got there.

Q. Now I will repeat my question: Did you discover at any time irself any place where there were vacant spaces left not filled?—A. hink not; nothing more than what would naturally be left from the y's work.

Q. And that which was thus left you filled up, you say, did you?— Yes, sir; of course we commenced where they left off.

Q. So you never discovered any vacant spots left?—A. I did not.

Q. And all the bad work that you did see, if I understand you, was rely little spots?—A. I would put it in that way; that they were rking, as I thought, to a disadvantage, and not the way I wanted em to, and I would tell them that.

Q. Do you mean that bad work that you did see?—A. If I saw a ne the wrong way I would naturally tell the man to turn it the other y, and put it in solid; I would tell him, "Why don't you put the ne down solid, in a certain way," and all that kind of thing.

Q. Are you sure that the packing done under you in Rock Creek, ich was in the spring of 1887, if I understood you rightly as to the te, was cement packing, or was it dry packing?—A. Well, yes; it was nent packing; it didn't have perhaps as much cement as it might ve had, but we would put a course of stone and then put cement.

Q. Did you not know and observe there during that time that a good al of that packing was dry packing?—A. Yes, sir.

Q. What did you do about it?—A. When I caught them in that I uld stop and wouldn't allow the work to start again until the cement ne and they put more cement on.

Q. And then go on again with dry packing?—A. Oh, no; we would to keep the cement on the packing, but oftentimes we would have stop the work.

Q. Put the cement on the packing; how did they put the cement on the cking?—A. They would just lay stone down, and then lay cement wn, and put a course of stone on the cement, and then make another irse of cement.

Q. Build it up like a solid stone masonry mass?—A. Not exactly as a id wall; no, sir, it wouldn't be solid.

Q. Why did you not cause them to make it solidly?—A. That wasn't actly what I thought was required.

Q. What did you think was required?—A. That they should put the cking in and put cement on it, and make it solid, but not as solid as u would build a masonry wall. I think there is a difference between cking and a solid wall.

Q. How did they put the cement on—by pouring it out of the pail, or w?—A. Sometimes they would put the pailful down on a flat stone, d then use the trowel, and put the cement on with a trowel.

Q. Over the top of the course?—A. Yes, sir.

Q. They did not try to fill in between the courses of stones?—A. , sir; not entirely solid.

Q. The requirement was, was it not, that it should be solid?—A. I rdly know. It is a simple thing for me to say, but I never had no ecifications—nothing but verbal.

Q. What was the verbal direction you had?—A. They were there l seen how the work was done.

Q. No, that is not the question; what were the verbal directions you d?—A. To put the cement on it, and do it pretty much as I say.

Q. Will you not repeat that? Tell us exactly, if you can, what th directions that were given to you by your superior were. Was tha Colonel Kirlin or was it the engineer?—A. I never seen no engine in there.

Q. Who gave you the directions?—A. Colonel Kirlin, I suppose. H told me that I would put a course of stone in, and I would have to s that the cement went in. There was no particular specified way to it, only in a general way, and to see that they had cement put in amo the stone.

Q. Did you not state before the military court the other day that yo instructions were explicit and to the effect that the packing was to laid in cement?—A. Yes, sir; something to that effect.

Q. Did you not understand that to mean that it was to be laid solidl so that all the spaces between the stones should be full of cement?- A. No, sir; not exactly. I didn't understand it in that way.

Q. When you finished in Rock Creek east, you then went over June to Rock Creek west, I understand you?—A. Yes, sir.

Q. How far from the foot of the shaft did you begin work, as near as you can judge?—A. Well, as near as I can get at it, it was 3,1 or 3,170 feet, I think, was the number of feet that were commenced ba from the shaft.

Q. Which way did you work?—A. We worked then east.

Q. Did you have the same gang of men?—A. No, sir; not the sa ones; generally the same; the masons would drop out and others wou come in.

Q. What kind of packing did you superintend over there?—A. Abo the same sort.

Q. Did you discover or know of any vacant spaces being left?—A. think not.

Q. The packing went in in the way you have described that it we in on the east side?—A. Yes, sir.

Q. You did not know of or hear of any vacant spaces being left?

The WITNESS. On our part?

The CHAIRMAN. Yes.

The WITNESS. No, sir.

Q. Were you night inspector then?—A. Yes, sir.

Q. Who was the day inspector?—A. Mr. Boyce. If there was a vacancies he was there in the day-time to find it out, and Mr. Kir was there to pass through there every day, and the engineers, too.

Q. You were also there to find it out if there were any, as well as Boyce?—A. I was the inspector at night. As I say, when I left, if a thing was done bad, certainly some one should see it.

Q. And the same would be true of the man who came on when y left, would it not?—A. There was two hours between the time of t men. I would come in at 7 and go out at 5, and he would go in a o'clock in the morning.

Q. Was work going on in those two hours?—A. I don't know wh was done in the two hours.

Q. Was it expected to go on in those two hours?—A. No, sir; wasn't authorized to go on by us.

Q. Did you not arrange with Mr. Boyce to make some mark by whi you would know when you came in, two hours after he had left, or wh he came in two hours after you had left, where one or the other h left off?—A. No, sir; I don't think we did. There was nothing s about it. I always thought he had left off where I commenced.

Q. What made you think so?—A. Well, it looked as if it was th way.

Then your two-hour theory would not work, so far as your under-
ing goes. You had no reason to suppose that the men put in any
, good or bad, during that two hours?—A. I had not; I don't
of anything.
Did the gang come out when you went in?—A. Yes, sir; and
came immediately away. Some of them would go out the other
at the other end.
The night gang did not work during the day too, did they?—A.
ir. The way they worked was this: One week they would work
e day time, and the next week they would work at night, that is,
orkmen, but I was there all the time. As I was the youngest
I suppose they put me on at night.
Did you discover any bad work in Rock Creek west while you
there?—A. Nothing more than what I said before; nothing
was any particular bad work.
Did you ever hear of any bad work in Rock Creek west while you
engaged there?—A. I did not.
Did not Colonel Kirlin discover some, or somebody tell him about
, and speak to you about it?—A. No, sir; not last year.
What do you mean by last year?—A. 1887.
How long did you work in Rock Creek west in 1887?—A. We
ed on the 17th of September.
Where did you go then?—A. Work stopped, so far as I was con-
d.
And you ceased to be paid?—A. Yes, sir.
When did you begin again, if ever?—A. I came down here on the
June, 1888.
And you were appointed a subinspector again?—A. Yes, sir.
Where did you work then?—A. I worked part of the time at Rock
, at stone-work part of the time; I think we worked about four or
days in Rock Creek, and then would go four or five days up to
dry Branch, and then back to Rock Creek again, and came back-
s and forwards as they were ready for work, until I should think
out six or seven days there was some brick-work done up about
dry Branch, and I was there. They changed this work from last
to this. Now I am talking about the work last year; that was
in a different manner from what it was done this year. The work
slower. We put an invert in the bottom and put up side walls of
. This year they put up a side wall of stone a certain height, and
d the arch from that, and the work went on a great deal faster.
ad of three courses of brick all around, they put two, and when I
I that I couldn't keep up to the work I quit.
When did you quit?—A. I quit on the 27th day of June; I was
twenty-seven days altogether.
During that twenty-seven days did you observe any bad work?—
Well, there was some bad work done; yes, sir.
Did you see it yourself?—A. Yes, sir.
What did you do about it?—A. I quit. When I found it was
I quit.
How long had it been there when you found out that there was
work?—A. I wasn't there a half hour, I suppose. I don't know
they worked it.
Tell us just what you discovered that was bad.—A. One day they
working at a place. I think it was between 11 and 12 o'clock, and
lace was a very tight one, and I had to get out; one side of it was
ed, and the roof was down close, very low, and I couldn't see

unless I would get down on my knees and look under, and one of t packers went below and worked there, and I left this place for an ho I suppose; and after dinner, when the colonel came in, he jumped into that bad place and called my attention to it.

Q. You went out to dinner?—A. Yes, sir.

Q. Was that the first time you had been out to dinner?—A. No, not this year. I was close to the shaft. I went out to get a little ai

Q. What kind of bad work did you say Mr. Kirlin found?—A. found the work put up without any cement, as far as I know.

Q. Did you go up and see this place?—A. Yes, sir.

Q. Was there not a hole there?—A. No, sir.

Q. Mere dry packing?—A. Yes, sir.

Q. Was it full of dry packing?—A. Yes, sir.

Q. Was that the only instance during that twenty-seven days t you knew of bad work?—A. That was the only instance I found. was going to say that I had spoken of the difficulty of doing the w and having it done right, and complained—if I am to be allowed to t about that.

Q. You complained to whom?—A. Well, sir, I will have to exp it in my own way, I suppose. On Saturday evening this Mr. Brig that was an assistant inspector as I understood, and it was so s when he first went into the work, and him and I were working toget and managed the two places. It went on until they commenced ing brick, as I say, about six or seven days before I quit, and inst of three courses of brick they laid two, and they went a great faster and were very particular, and made a great to-do about and Mr. Briggs would come up to me in this kind of a way [indicat and would say, "These fellows below here are getting ahead of they are doing more work than we are." I would say, "Are they they are, how do they do it? They don't do it as good as we do or better." Or I would say, "How do they get along? I have trou enough with my packers to be around with them all the time and that they do it even as good as it is done," and so on. But that wor me.

I intended to quit before Saturday, the 27th of June; I suppose I m up my mind to quit about the 23d, and I seen Mr. Brennan, one of contractors, and said I, "Mr. Brennan, Mr. Briggs comes along h and he talks about the work; he don't seem to be satisfied with w we are doing, and thinks we are not doing enough work, or someth of the kind, and he says they are doing work down below there, don't seem to like the way we are getting along in this way; you m have more inspectors, and better ones, for I can't get along with packers as it is; I can't follow them up." While I was talking to Brennan, Mr. Briggs went along, and I said, "Come here, Mr. Bri I want to say it before you; I have been telling Mr. Brennan th want more inspectors, and better ones; men who can handle the st better; there is a great deal of difference in men; some men can p stone in the right place right away," and all that kind of thing. T went on until this hole was found on Wednesday, and I seen—at l that was my opinion—that there was a web weaving around me al that matter, and I told them I would quit.

In the meantime, on Monday evening, I came over to Washing Mr. McComas had recommended me in the first place, and I told h was going to quit. He asked me why. I told him, "They are wor a great deal faster than I can stand it, and I have got to quit; health wont allow it." "Oh, no," he said, "you needn't quit, and

't do anything with you." I told him that wasn't what I meant; t I meant that I was going to quit; that I couldn't keep up and do ice to the work and justice to myself, and I would quit. I should e said perhaps a while ago that this black man that was working re was often within hearing of me, and I would say to him, "Zack, d what you are doing; put cement in there, and do it right; and he ld say, "All right, boss; it is all right."

. Who was the boss mason?—A. This man Terrell. He told Colonel lin right before me that the blame was on him. He said, "It is my t; that is not his fault." The colonel told him to go and discharge black man, and all that sort of thing. Said I, "It is not his fault; ebody told him to do that thing." That was my own opinion about I don't say that as the truth.

. When you believed this thing was done while you were gone to ner what did you do first when you came down to where the work ?—A. I went down to the work. This was up in the arch.

. It was your business to go up in the arch to see that it was properly e, was it not?—A. I suppose it was.

. Did you go up?—A. No, sir.

. Did you suspect anything at that time?—A. I did not. I said to black man, "Zack, is that all right up there? Did you finish that all right? Did you put the stone and cement in all right?" But place was so close there that it was impossible for me to stand aside let him do the work if I had been there, so I had to get out of the ; and besides, the other men were working below.

. What did the colored man say when you asked him if it was all t?—A. He said, "All right, boss."

. So you did not go up?—A. I did not.

. How many days after that was it that Kirlin came along and this ant chamber was observed?—A. He came right along, right where men were at work at that time.

. How long after you had got back from your dinner?—A. About een or twenty minutes, I judge.

. You say Kirlin observed it?—A. I don't know, sir.

. Did he go up on the scaffold and look at it?—A. Yes, sir; they ed me back. I didn't know anybody was up there at the time; I n't know anybody was working there at all.

. Where were you when they called you back?—A. I was down ow where the men were at work, the regular men.

. What were they doing down there?—A. Laying brick.

. Laying the side-walls?—A. Yes, sir; laying the arch.

. They were laying the side-walls, and this packer was on one side, the brick-masons on the other?—A. Both packers were away from place.

. Both packers were down working on the sides?—A. Yes, sir. It ld be about 40 feet from where I was to where they were.

By Mr. DAWES:

. I did not quite understand what you meant by saying that the k went on so fast that you could not keep up with it?—A. Last r, if I am allowed to explain it, we put up the brick wall ourselves. masons put up the invert or bottom, and turned the side-walls 5 , and then started the arch. This year the stone wall to start the h on was built ahead by another set of masons.

. Did it go so fast you could not see it all?—A. Yes, sir; I couldn't it.

Q. That is what you meant?—A. Yes, sir.

Q. You did not have any of the work to do yourself?—A. No, sir.

Q. All you had to do was to see that they did it well. If you had directed them to do it well they would have gone more slowly, would they not?—A. No, sir.

By the CHAIRMAN:

Q. Now to come back to 1887. Did you keep any time of the men in 1887, at any time, for the contractors?—A. No, sir.

Q. Did you work overhours?—A. No, sir. I worked one time one morning about two hours without any person asking me to. We were behind with our packing, and Mr. Boyce—there would be a space perhaps as long as the top of this room, a continuous place, that we had to keep as near as we could—I don't know that he asked me, but there was an agreement between us that I would stay a couple of hours and see to that, but no person asked me to do it.

Q. How much pay did you get from the Government?—A. Seventy five dollars a month.

Q. Did you receive any money from anybody else during that time?—A. No, sir.

Q. On any account?—A. No, sir.

Q. Either as a present or loan for anything?—A. Not a cent; nothing at all. No person ever said anything to me about it. I never seen any body, mister, as I said before.

Q. How was it this last summer, during that twenty-seven days? Did anybody pay you anything besides your regular Government pay?—A. No, sir.

Q. Did anybody ever tell you that he would pay you anything?—A. No, sir.

Q. Neither Brennan, nor Palmer, nor anybody?—A. No, sir; nobody ever suggested anything of that kind. I didn't consider that I had fairly got to work this summer, because I expected to have one place or the other. Mr. Briggs and I agreed that we would follow the stone-masons. The reason I speak about having so much to do is the stone-masons was within sight of me, that is, they were 100 feet ahead of me, and occasionally I would have to go to see them, to see that they would start the foundation right, and such as that; that is what they asked me to do, and I would go up there sometimes, and when I would come back to the brick-masons, and between the two I thought it was a little too much for me.

By Mr. FAULKNER:

Q. You inspected there in the Foundry Branch east heading, did you not?—A. Yes, sir; that was this year.

Q. That was when the first defective workmanship in packing was ascertained by Lieutenant Townsend, was it not?—A. Yes, sir.

Q. Did not Lieutenant Townsend then inform you that if that occurred again you would have to be discharged?—A. No, sir.

Q. He did not?—A. No, sir; he didn't.

Q. Did he not tell you that in the presence of Mr. Kirlin?—A. No sir; he wasn't there. I didn't see Lieutenant Townsend that day at all.

Q. What was the character of that defective work in Foundry Branch east?—A. Well, the stones laid up loose on one side of the arch.

Q. Was it not on the side walls?—A. Up in the arch, on the side walls, you know.

Q. What was the length of that defective packing?—A. I don't know exactly how long it was.

. Was it about 20 feet?—A. No, sir; I don't think it was 20 feet; uldn't tell, Mister, how large the place was there; it was closed up, I couldn't see.

. Was that not in a condition that you could have seen the dry pack- without any difficulty?—A. If I had been there all the time I could e seen it, but I couldn't be there all the time, you know.

. How long would it have taken to fill up with dry packing masonry eet long and 6 inches wide and 4 feet deep?—A. It would take two ree hours, I suppose.

. Could you have been absent that length of time?—A. Yes, sir; I absent at another place often, two or three hours, in another part ne work. They would be working below, as I say, and this would ft above there, and the bad packer up there, and when I would come spect it he had it in a certain place in a certain way, you know, and aps he would have it finished, at least so far as I would know it ld be finished, and I couldn't see what would be under it unless I ld have it torn out.

. How far did you have to go from this point to inspect other parts ne work?—A. Altogether it was 56 feet; sometimes there would our centers up at one time.

. Do you mean to tell the committee that you would be 56 feet y from this point for two hours where the packing was defectively e?—A. Sometimes I would. No, I don't recollect ever being absent long, but I say it could be that way; because, if the stone-masons e at work down below, I would have to go there sometimes, and be e perhaps an hour.

You remember this particular instance that I called your attention o you not, where this defective packing was first found?—A. Yes,

How long were you absent from that point when that was being ?—A. About an hour, I suppose, right at that place that was found, at that one point. But what work was done before that, understand is bad work—may not have all been done in that time; it may have done and fixed over; I couldn't tell that. The particular work he found was pretty deep, and it would take an hour and a half or hours to fix it up.

What were you doing during that hour and a half or two hours this bad work was being done?—A. What else could I be doing e down where the other workmen were at work, sir.

They were doing what at that other point?—A. Laying brick and . There was only one man left in this place, and the other man below.

They were not doing packing down below?—A. Yes; certainly were.

Where they were laying brick and stone, and also packing at this point at the same time?—A. Yes, sir. If you will allow me to in, mister; when I told Mr. Brennan on Saturday that he would to give me another packer, on Monday when I went in there, about 11 o'clock, down where this other packer was that I was to have norning, he called to Pete or Bob, or some of the men, "Come up " and when the men got up I said "Where is your hammer or your l?" He said "I got none." I said "How did you expect to put ement on without a hammer or trowel?" He said "Throw it in a bucket." Them men were down there working, and I was tear- ut part of their work when the old colonel called.

That was the last time?—A. Yes, sir; he came in after dinner.

Q. Do not turn aside from what I was speaking about; I was spe
ing of the time when the first defective work was discovered.—A. T
was the first time; that was the only time.

Q. Did Colonel Kirlin call your attention to it the first time?—
Yes, sir; that was the only time he ever did call my attention to
The lieutenant was not in at all; they sent for him, I suppose. I t
them then I was going to quit.

Q. I am speaking of the time before the last, when you were worki
in Foundry Branch shaft east, and when Mr. Kirlin found that defe
ive masonry you spoke of on the side-walls.—A. He joined me th
and said, "That is bad work."

Q. Did Lieutenant Townsend find any fault with that work there
A. Not that I know of.

Q. You never had any conversation with him in which he told y
that must not occur again?—A. No, sir; that was about the sto
work; I was on the brick arch. I am glad you asked me that questi
He said, "Mr. Masters, I think them men is laying stone in water do
there." That was a hundred feet or more from where I was. I ask
him, "Must I go down there, and leave this work?" He said, "Y
must see that they don't lay them in water." I went right down
them. He then answered back and said, "Where is the other
spector?" Said I, "I don't know anything about the other inspect
he wasn't here at all to-day." That was the time with Lieuten
Townsend.

Q. The time that Mr. Kirlin found this defective work that was ab
40 feet in length?—A. That was brick-work; I don't know how mu
in length. I didn't stay there.

Q. You did not stay there to ascertain the character of that defect
work?—A. No, sir.

Q. Did Mr. Kirlin leave the defective work as soon as it was found a
go to Townsend?—A. No, sir; I don't know what he did.

Q. You left before they returned?—A. Yes, sir; I left right the

Q. It was not because Lieutenant Townsend told you that if t
occurred again he would have to discharge you?—A. Lieuten
Townsend never said no such thing to me; I don't know what he m
have said to others, but I didn't say anything to him; he didn't say
in that way at all.

Q. If there was 40 feet in length on the sides and over the key
the arch, part of it could have been done without you observing it
A. I don't see how it could have been done; I don't know hardly h
to answer such a question as that, because I can't see how there e
was 40 feet.

Q. But if there had been 40 feet, do you understand how it could ha
been done without you having seen it?—A. I don't think it could ha
been done without me knowing more about it, if it was done while I w
about.

Q. Considering the length of time that it would take to do that k
of work, you could not have been absent from that point that length
time?—A. No, sir; I don't think I was.

Q. And therefore, if such was the fact, if there was a place 40 fe
say, that was not packed at that time, you can not understand how
could have been done without you having seen it?—A. I don't kn
nothing of it.

By Mr. DAWES:

Q. Did you ever report any bad work to Lieutenant Townsend?—
No, sir.

Q. Did you to any Government officer?—A. Only to Mr. Briggs.

Q. Mr. Briggs was an assistant to you?—A. Yes, sir; Mr. Briggs and I talked about it every day almost; he would come to me, and we would talk about it. Said I, "Mr. Briggs, this work goes on very fast;" and I would say it to Colonel Kirlin, and he said "It is thunder, ain't it," or something of the kind.

Q. Did you report to anybody above you?—A. I considered Mr. Briggs, and Mr. Briggs acted as if he was above me; he would come to see me and take my measurements, etc.

Q. Were you ever directed by anybody to report to any one?—A. No, sir.

Q. And you never did?—A. Never did, only in a conversational way.

Q. When you say this was going on too fast, do you mean to say that it was not going on well enough?—A. I couldn't see that it was well enough; no living man can crawl along them centers. A man can deceive you and not be farther from you than you are from me.

Q. To whom did you report that?—A. Mr. Briggs and I were talking about it every day. I said, "How is it possible for me to go from here here as fast as you work?"

Q. I asked you to whom you reported?—A. To Mr. Briggs.

Q. Did you report it to anybody else?—A. No, sir. Well, in just a conversational way to the colonel. We would have just such conversations as this: I would say, "They are working very fast, colonel," and he would say, "It is thunder, ain't it;" and he said, "You ought to take a club and hit them in the head."

Q. Who told you that?—A. Colonel Kirlin; and I said, "You couldn't stop them with a cannon, hardly; you would have to have a cannon to keep them from tumbling over you, for you couldn't keep up with them."

Q. Did you report to Colonel Kirlin that they were not doing it well?—A. No; I didn't exactly say they weren't doing it well; he told me I would have to watch them.

Q. You complained that they were doing it too fast?—A. Yes, sir; I couldn't see that it was done.

Q. Was there any objection to their going fast if they did it well at the same time?—A. No. I thought perhaps if I had other different packers—you know I only had common men for packers, laborers, etc., that I didn't think was very good, and I thought if I had better men, men who could handle stone better and use the trowel better, may be I could get along and keep up.

Q. They would do it better?—A. Do it better.

Q. If you had better packers?—A. Then I would be able to do it better.

Q. Did you report the fact that the packers were not doing it according to the specifications?—A. No, sir; I don't know that I did, only in a verbal way, to Mr. Briggs. Mr. Briggs and I often talked about it.

Q. Did Mr. Briggs stand in any other relation to the matter than you did?—A. I don't know that he did, except that he went backwards and forwards, and didn't seem to be confined to any one particular point.

Q. Then you can not testify that Mr. Briggs knew all along that they were going too fast to do it well?—A. I thought from what Mr. Briggs told me——

Q. Do not go off and talk about what he told you. Then you and Mr. Briggs both understood that it was going along faster than it could go and be done well?—A. I don't know what Mr. Briggs understood about it.

Q. Then let Mr. Briggs alone. You knew you were satisfied?—A. I was satisfied.

Q. That it was going along faster than it could go and be done well?—A. Yes, sir.

Q. And you never reported to anybody?—A. I never reported it because I——

Q. The question is did you report it?—A. I did not.

The CHAIRMAN. I think he might state, if he wants to, why he did not.

The WITNESS. I made up my mind I couldn't attend to it, and was going to quit, and I told the men about me that I was going to quit.

By the CHAIRMAN:

Q. If you found that the thing was going too fast, that you could not inspect it so as to know certainly that it was done right, and you were determined to quit, why did you not report to Lieutenant Townsend, Kirlin, or somebody how you felt about it right off?—A. Well, sir, there wasn't very good feeling, I didn't think, between them and me; I never got no very good answer from them about any matters that I would mention.

Q. You say you did not mention these particular matters?—A. No, sir; they seen how it was themselves.

Q. What did they see how it was?—A. They seen how fast the work was going along. I didn't try to hide anything. If there was anything to hide I didn't know it. The work was open all the time. Mr. Brigg was agent for the colonel, and the colonel would come in, and the lieutenant would come in, and they all seen how it was going along, ought to have seen it.

By Mr. DAWES:

Q. What do you mean by saying there was no particular good feeling between you and them?—A. I don't know that I can say anything about that.

TESTIMONY OF GEORGE H. CORYELL.

TUESDAY, *December* 11, 1888.

GEORGE H. CORYELL, sworn and examined.

By the CHAIRMAN:

Q. What is your age?—A. Thirty-nine.

Q. What is your occupation?—A. Civil engineer.

Q. How long have you been civil engineer?—A. About twenty years.

Q. Where is your home?—A. I reside in Washington.

Q. Have you resided here during that twenty years?—A. No, sir; only since I became connected with this work.

Q. Where had you resided before you came to Washington?—A. At Hagerstown, Md.

Q. What principal work had you been doing before you came here about four years ago?—A. I was engaged in the construction of the bridges in Baltimore, as resident engineer; the Saint Paul street, the Chase street, and Pratt street bridges; I was there until that work closed.

Q. When did you come here?—A. The 15th of October, 1884.

Q. And began work in connection with the extension of the water supply?—A. Yes, sir.

Q. Whom were you under?—A. Captain Symons.

. To what duties were you assigned?—A. Assistant civil engineer
harge of the tunnel.
. Tell us what was the condition of the tunnel when you began?—
t was in a perfect state, you may say, of confusion and chaos; that
could not ascertain from the records of the office or other parties
condition of the work. They did not have in the office at that time
longitudinal section showing the new elevations of the shafts or
grade of the lines of the work. The only longitudinal section they
was an ideal one, upon which the work was let; and in the course
onstruction they went down much deeper than this section indi-
d; but they did not possess in the office the actual elevations of the
k when I came, and the work had been in progress for some time;
a year probably. I suppose there was about one mile excavated
n I came, October 15.
. You do not mean one continuous mile?—A. No, sir; aggregating
le altogether.
. How many shafts from which drifts had been started were there
ake up this total of a mile of tunnel work?—A. Howard Univer-
Champlain Avenue, Rock Creek, Foundry Branch, and the west
t.
. What was the longest tunnel excavation that you remember at
time?—A. That was in the western end, in Rock Creek west, I
k; I can tell you exactly by reference to memoranda.
. Well, tell us exactly.—A. (Referring to memoranda). The total
th of the tunnel excavated October 15, 1884, aggregated a distance
,129 feet, made up as follows: East shaft, west drift, 305 linear feet;
mplain avenue, east drift, 642 linear feet; Champlain avenue west,
; Rock Creek east, 857; Rock Creek west, 1,026; Foundry Branch
, 765; Foundry Branch west, 745; west shaft east, 167; making a
l of 5,129 feet.
. What was the depth below the ideal grade or level that all those
ts actually were, if anything? State it in detail, if you have a mind
—A. We commenced there and worked westward. The east shaft
16.7 feet; Champlain avenue, 9.8; Rock Creek, 1.9; Foundry
nch, 14; west, 31.9. That is quite different from—I was going to
—the Report No. 3109, Forty-ninth Congress, first session, being
louse document, in which Major Lydecker gives the total entirely
erent from the actual depths. I can read those elevations if you
ld like me to do so.
. What is the date of that part you refer to?—A. This is May 6,
6, page 45, statement of Maj. Garrett J. Lydecker, commencing at
t shaft.
. State what his figures show.—A. At east shaft, 27.7; Champlain
nue, 24.1; Rock Creek, 16.4; Foundry Branch, 28.5; West, 47.6.
ll I state the differences between the two?
The CHAIRMAN. Yes.
The WITNESS. The difference in the east shaft would be 11 feet;
amplain avenue, 14.3; Rock Creek, 14.5; Foundry Branch, 14.5;
st, 15.7.
. Does Major Lydecker's report show a less depth, or a greater
th than your figures?—A. He shows a greater depth in every in-
nce.
. The actual depth was less by the differences you have stated, as
found them to be at that time?—A. Yes, sir.
. How do you account for those differences?—A. I can not account
the differences at all, because at that time he evidently compared the

ideal profile which I speak of and the correct profile which I had got up for the work, and he took the differences from them, but how obtained those results I do not know.

Q. Did you find at that time, when you went on with your duti that the direction of the tunnel was out of line in any place?—A. fore I was really appointed I came on from Hagerstown, in answer t telegram from Captain Symons, in order to visit the work, with a vi of taking hold of it. I then visited nearly all the drifts, but I did visit the east drift of Champlain avenue. I was not aware at t time that any error had been committed in the work. I noticed, h ever, in going through Foundry Branch east and Foundry Branch we that the excavation was very irregular and presented a very crook appearance. I was in company with Captain Douglas, who was superintendent for the contractors, and I asked him why that was. said his instructions were that it did not make any difference whet the lines in the tunnel or the sides were any closer than 6 inches that the line was not obstructed. I asked him what his object was working that way, because that seemed to me to increase the leng and he said they could make greater progress by following the sea of the rock and varying it in that way. After I had visited the dr I saw Captain Symons and told him that I thought that I could br the tunnel headings together, and I would accept the position. He quired about my work at Hagerstown, and asked what recommen tions I had in regard to other work. I had my recommendations w me, and presented them to him, and he read them and appeared to satisfied. He said that Major Lydecker and he had come to the c clusion that it was best to have one man in charge of the work, inst of having it divided up, as heretofore. There were at that time two gineers connected with the work. He said he would engage me on p bation; that I was to serve a probationary period of three months the rate of $1,800 a year, and, if I gave satisfaction, at the expirat of that time he would increase my salary and make my position a p manent one. The question of salary, after that, would be satisfacto he said.

Q. Did you call his attention to what you had observed as to crookedness of the excavation?—A. I think I mentioned it to him that time. I will not be positive about that; but I discovered it that time, and very likely I mentioned it.

Q. Can you remember any reply or observation that he made wh you mentioned it to him, if you did mention it?—A. No, sir; I can n However, I was to report for duty on the 15th of October, 1884, a this conversation took place in the latter part of September. I had make my preparations to leave my work at Hagerstown in pretty go shape, and so I could not report here before the 15th of October. said he would be absent at that time; that he was going on a trip; that Major Lydecker would be present at that time and give me a information, and until his return I could familiarize myself with records and plans in the office. I came here on the 15th of Octob according to appointment. I was introduced to Major Lydecker, w received me very cordially, and during the course of the conversation s that an error had been committed in the east drift of Champlain aven That was the first time I knew that any error had been committed the work; I had presumed that I was only to take charge where other engineers had left off.

Q. You may mention right there who the other engineers were, you understood?—A. John A. Partridge, in addition to his duties

gineer of the reservoir, had charge of the east shaft and Champlain enue; Mr. S. P. Merrill had charge of the remaining shafts; that is ock Creek, Foundry Branch, and the west.

Q. In which one was it that Major Lydecker said an error had been mmitted?—A. It was in the east drift of Champlain avenue.

Q. That was under the charge of Partridge?—A. Yes, sir.

Q. What was the error that Lydecker said had occurred?—A. He id an error had occurred in the line of the tunnel, and that it had en reported to Captain Symons, and he had fixed the responsibility that work.

Q. What was the nature of the error?—A. The alignment was enely cut off; it was on the north side, in close proximity to the shaft; e line was in the rock there, I should judge, about 7 or 8 feet, and in der to regain the line they made a bend around and got back apparntly to the line.

Q. That had already been done when you came?—A. That had ready been done. I believe that Mr. Merrill engineered around that nd.

Q. Then when you began were the lines, as to direction, so that the ifts would meet correctly?—A. No, sir. I had to institute a resurvey the entire work. The Government inspectors and superintendents the work were positive that the work was going wrong, from the fact at the work was being mismanaged in such a manner that there was one really to look after it.

Q. What did they mean by "going wrong?"—A. In the wrong direction.

Q. So that the headings would not meet?—A. Yes, sir. So I instited a resurvey of the whole work. I first ran the surface line. I ould like to read here the report of Captain Hoxie in relation to the rvey.

Q. You can refer to it.—A. In his report for the fiscal year ending ne 30, 1884, he states they had observatories erected on the hills at e end of the line of the tunnel. These observatories were blown down. that I commenced the operations on the work on the surface without e aid or facility of those observatories, and retraced the line from one d to the other. I commenced at Champlain avenue and worked westrd, and then came back and worked eastward. I found the principal ints of that survey correct. There were, however, no points immeately at the shafts, as there should have been, to have permanent umb-lines fixed in there that would remain in there as long as the rk was under construction. Then after I had satisfied myself as rds the surface line, I transferred the line from the top to the bottom the tunnel, and projected those lines in the several drifts, and estabhed permanent marks at certain stations, to which I can refer.

Q. How did you find the work below, as compared with the surface e?

The WITNESS. How was the alignment of the tunnel as regards the rrect line?

The CHAIRMAN. Yes.

The WITNESS. It varied very much in the Howard University drift; at was the east shaft; the men call it Howard University because it s close to that building. It ran at an angle right from the shaft, and about 100 feet from the shaft there was a roof plug driven in the nnel, and this roof plug was centered with a screw-eye. My line was t 6 inches or a little more from that point, and at a point about 600 et from the axis of that shaft it varied 3.3 inches. There were two

stakes driven in the roof, one indicating the line I had put there the other indicating the old line. I felt very dubious about maki change in the work, and I called Captain Symons's attention to it he went down the drift with me to look at it. He asked me if I satisfied that my line was right. I told him yes, that I had worked carefully; that I had worked there, you might say, nearly every n and every Sunday, and had worked all day, and had verified the l and I saw they were correct. At this first place there was only a ation between the two lines of the east shaft and Champlain av of less than 4 inches. Had the drifts been projected upon the that were in the tunnel when I came there, there would have be variation of over 21 feet.

Q. That is, there would have been that much difference betwee lines at the point where the headings should have met?—A. Yes Howard University drift was 3,317.1, and Champlain avenue was feet, and the connection occurred 144 feet east; that would ma difference of 21 feet at that shaft. My line struck one side of the shaft, which is a 6-inch pipe driven from the surface for the esca air.

Q. So that your survey of the alignment turned out to be sub tially correct?—A. Yes, sir; it was within 4 inches.

Q. And if the work had gone on according to the lines projecte you found them when you were there, how would it have been? There would have been a variation of 21 feet and 8 inches.

Q. That is at the point where the two drifts should have met? Yes, sir. The grade in the east drift of Champlain avenue occu at a point distant 771 feet east of the axis of Champlain avenue s

Q. What was the matter with that grade, if anything?—A. grades originally projected, if continued, would not have met.

Q. One would have been too low and the other too high?—A. would have been too low and the other too high. We changed grade in the west drift of the east shaft at a point 600.8 feet fro axis of the east shaft.

Q. Describe what that would have resulted in if it had been follow A. If they had continued that grade the grade would not have nected with the grade advancing from the Champlain avenue There appeared to be no established grade, as far as I could lea regard to that work, except, I may say, in the western end of the nel. Mr. Merrill showed me a book of some grade lines; the vari of those grades would not have been very much in the alignment may say, and in his work there would not have been any greater v tion than 5 feet.

Q. Was it not intended that the surface of the bottom of the tu should be at several different inclinations, so as to drain the tunne were empty?—A. Yes, sir.

Q. These differences in gradients that you have spoken of wer attributable to that performance?—A. No, sir.

Q. But were faults in engineering, as I understand?—A. Yes The grades were supposed to be located at the summits, and the gr from the different working shafts were supposed to run to that e tion. They were not running on that direct line; hence the chan the work.

Q. In this nearly a mile of excavation, that existed altogether you went into the work, what did you find to be the character o rock, so far as the tunnel had been driven? State each place by i if there was any difference.—A. The rock in the whole tunnel prese

ety of structure. Its weakness, you may say, arose from the veins ssures in the rock.

Describe what it was.—A. In the Howard University rock the there, for about 150 feet probably, was of a very tough character; s, it was what you would call hornblende, a very tough rock.

Was it sound?—A. The rock for that distance was self-supporting.

Was it sound as regards fissures, cracks, and seams?—A. No, sir; ock throughout the whole drift was fissured or seamy; there might stretch at different intervals, probably, where it would be compact, night say, but only in short places.

Were those short places capable of holding water under heavy ure without lining?—A. No, sir.

Now take the other places.—A. In Champlain avenue east, for 800 feet, the rock was self-supporting, a mica, schist, or micaceous That locality required lining, on account of the fact that in the e of time it would disintegrate. At the time I came all of it was at character, and I so reported. In Champlain avenue west it was e same character; the rock was of the same mica schist, but the s were cut up; that is, talc seams ran through the mass of rock, hat left it in irregular blocks, that would drop in the tunnel, those s cutting it in different directions. That tunnel was timbered; at lace, I understood, about station 3 plus 72, a slip occurred, and ad it timbered with cord-wood.

Three plus 72 where?—A. Champlain avenue west. None of the has been lined, however.

That timber, I suppose, was to keep it from falling in?—A. That he object, yes, sir; to support it until they could get the lining in. ock Creek east and Rock Creek west no timbering was put in drifts.

What was the nature of the rock there at Rock Creek east drift?—ne rock was mica schist throughout. At the shafts the rock ap-d to be very solid, but there were veins through it; that is, it would o to allow it to remain without lining. In the Foundry Branch, and west, the rock was of a seamy character. In the west shaft ock was very rotten and easily decomposed.

That is the shaft that descends to make the connection with the eservoir?—A. Yes, sir; that was very bad in there. They had red in there about 50-odd feet before I came there. The rock was and decomposed; you might call it gneiss.

Seeing that in that condition, as to the character of the rock at ime, I understand you to say that there would be almost none of t would not require lining in order to hold water under pressure?—think so; yes, sir. That is the conclusion I came to after making rough study of the work.

And I understand, from what you say, that a good deal of it was osed of rock that in the course of time would disintegrate on ex-e to moisture and air?—A. The greater part of it; some probably not.

But large parts of it would?—A. Large parts of it would; yes, The entire drift of Howard University; you may say forty per of that is timbered.

Can you tell me how much water came into these various drifts ?—A. The water in twenty-four hours at Howard University I had d, and I understand that there was a discharge there of about 0 gallons in twenty-four hours.

Q. When you began?—A. When I had it gauged; I didn't meas
that at the time I began.

Q. How soon afterwards?—A. That was some time afterwards
don't recollect the date exactly.

Q. At the time you gauged this inflow at Howard University d
about what was the length of the drift?—A. If I could recall the ex
date I could tell; probably it was 2,000 feet.

Q. And 123,000 gallons a day were taken out?—A. Yes, sir. I
a barrel on top, and about 50 gallons was found to flow in about 35
ouds, and from that I calculated about the amount. In the other dr
the amount of water was not so much. I never gauged the wate
Champlain avenue, but I should judge it would be 100,000 gallon
twenty-four hours.

Q. At the time you began, in the fall of 1884 and along into
winter of 1884–'85, after you had familiarized yourself with the wh
condition of the thing there, did you know what was the design, a
regarded the finish of the tunnel, whether it was to be lined c
through, or whether it was to be lined only here and there, or what
A. Well, I think it was to be lined in patches, only at those pla
where these talc fissures occurred, and of course where it was timbe
Under orders from Captain Symons I went through the tunnel wi
view to ascertaining where lining would be required, and he w
through with me after that and looked over these places. I thin
stated in my report for 1885 that there was a distance of over 10
feet that was cracked.

Q. When you reported that 10,000 feet would require to be lined,
much of the tunnel yet remained to be excavated?—A. That was J
30, 1885. The total length of the tunnel lined June 30, 1885, is ab
12,483 feet.

Q. What I want to know is, how much of that 12,483 feet at that t
excavated, in your opinion, as then reported, required lining?—A. Se
thousand two hundred and forty feet out of the 12,483 feet.

Q. And there yet remained to be excavated at that time, on the
of July, 1885, how much?—A. Eight thousand two hundred and thir
feet.

Q. In that 8,213 feet did you estimate the probable amount of lin
that would be required?—A. Yes, sir.

Q. Which would make the total of the 10,000 feet you have spo
of before?—A. Yes, sir. Of course it was beyond human reason
determine that thing exactly, but I judged from the character of
rock at that time as well as I could.

Q. But I understand you now to say that you think the whole len
of the tunnel requires lining to carry water under the conditions t
exist?—A. I think so; yes.

Q. But at that time, evidently, you did not, if those statements w
made in your report?—A. Yes, sir; I came to that conclusion af
wards.

Q. What led you to change your opinion?—A. The object of Cap
Symons was to reduce the amount of lining as much as possible.

Q. That was with a view to economy in expense, I suppose?—A. T
was the idea, and so he confined me to those portions of the tun
where it was absolutely required, and that report was based upon th
conditions; it was not really my own notion of the work, because
whole thing I thought should be lined. I was satisfied of that.

Q. But he required you to limit your estimates and report t
lining at points where, according to the then present appearance,

ng would absolutely require to be lined?—A. Yes, sir; and he went h me after I had chalked out these different portions, and the doubt- places he reduced.

Q. Did you make daily or weekly or monthly reports in writing of the ogress of the work?—A. Mr. C. V. Tarbell and Mr. Woodward were tunnel inspectors, and they returned a daily report.

Q. They were tunnel inspectors under you, employed by the Govern- ut?—A. Yes, sir.

Q. And they were inspecting at that time?—A. They would go in the nel every day. For instance, Mr. Woodward had charge of the west aft, Foundry Branch, and Rock Creek, and Mr. Tarbell had charge the east shaft and Champlain avenue, east and west. They would it the tunnel every day and measure the distances, and make their ort upon that, and also include in their reports the number of holes l the amount of powder used.

Q. Were they engineers?—A. No, sir.

Q. What was their occupation before they were employed in that siness?—A. I don't know, sir; I think Mr. Woodward had been an pector on some work; I don't know where; I think for the Govern- nt somewhere.

Q. Were they persons of skill, suitable to report to you the nature of rock as it appeared as the excavation would go on from day to day; nature of the explosives, whether too heavy charges of powder were d; and the accuracy with which the excavation followed the pro- ted lines that you laid down?—A. They were very intelligent men, l I think they performed their duties satisfactorily. Mr. Tarbell was educated man, and he was very zealous in his work, and he looked er it very carefully.

Q. Those reports were made to you, as engineer in charge?—A. As gineer in charge.

Q. And by you transmitted?—A. To Captain Symons.

Q. Monthly or weekly?—A. Daily.

Q. During this time, down to the 1st of July, 1885, was there ever y report made by you to Captain Symons—he was your immediate perior, I believe—regarding the bad nature of the rock and the diffi- ties that appeared to present themselves from time to time, as to the ssibility of doing that work within the time and at the expense that l been estimated?—A. I do not recollect. We had many conversa- ns in regard to the work. Captain Symons was particularly anxious have the work shoved through as rapidly as possible, and he would ke examinations of the rock occasionally.

Q. Did you, down to that time, have any conversations or discussions regards what would have to be done in the end in order to make t tunnel hold water and carry water?—A. I am not positive, but I ve had with Lieutenant Townsend.

Q. That was later on; but I am confining myself now to the time wn to the 1st of July, 1885, after you had been going on for six or en months, whatever the time was. Did you have any discussions conversations regarding the question whether the nature of the rock, the excavations increased in length, was different to what it had en expected to be when the Chief of Engineers or the Secretary of ar authorized the tunnel to go on?—A. I think we have had conver- ions of that kind, but I can not speak positively about that. I know have had repeated conversations about the work.

Q. When was the holing of the tunnel, as it has been called by some the witnesses, completed?—A. The first connection was made be-

tween Foundry Branch and the west shaft July 31, 1885; this con
tion occurred at a point 2,208 feet from the axis of the Foundry Bra
shaft and 2,209 feet from the axis of the west shaft. The next hol
was between Rock Creek and Champlain avenue; that occurred
vember 14, 1885; the distance from the axis of Champlain ave
shaft was 2,062 feet; the distance from the axis of the Rock Cr
shaft 2,134.5 feet. The next holing was between Rock Creek
Foundry Branch; that occurred November 8, 1886; that occurre
a point 3,552 feet from the axis of Rock Creek shaft, and 2,875.7 f
the Foundry Branch shaft. The next holing occurred between
Champlain avenue and the east shaft, and that occurred July 1, 18
at a distance 3,317.1 feet from east shaft and 3,348 feet from the Ch
plain avenue shaft.

Q. Was that the last?—A. That was the last. I raised the arm
the battery to set off the explosion in the east drift at 12 o'clock J
1, and went through to Champlain avenue.

Q. During your time there, which covered the amount of tunnel
cavation you have described, how was the work carried on by
miners as regards preserving the limited space required?—A. W
some of the miners were very anxious to rush the work and they w
not very particular in some places to keep to the lines of the tun
they would not confine themseves exactly to the line, and in some pla
it would be narrow.

Q. How about those places where the amount of rock excavation
in excess of what was required by the contract, profiles, and specif
tions?—A. In the system of excavation there were four different
tions. The first was a normal section, rectangular section of 11 fee
width by 7.5 in height, making 82½ square feet. Nearly all of the d
west of Champlain avenue were taken out to that normal section, ex
here and there where timbering was put in. My impression is that
only timbering placed in there was in Rock Creek west, about 1,600
from the shaft. The other section was the outline of the arch, wh
lining was required in rock that did not necessitate timber. That r
was excavated to the outer ring of the arch, circular in shape. T
was what was allowed the contractors; that was the area, 109.67 squ
feet. The next section in timbering around was only where deep
bering was required. That area was 143.4 square feet. Then the o
portions, where it required side timbering and roof timbering, the
was 167.3 square feet.

Q. How did it happen that any side timbering was required?—
That was where there was a heavy strain upon the rock; that is, th
side timbers formed a brace to support it.

Q. To keep the rock from coming in at those places?—A. To k
the rock from coming in. That supported the top timbering—gav
more stability, you know.

Q. Was there any side timbering required to keep any of the
rock from slipping in?—A. Yes, sir. The rock would come in latera
It would strike the rock at about that angle [indicating], and the r
would drop in from the sides also; and that timber was put in to
port the rock from above.

Q. Can you tell us, the whole excavation having been made, w
were the total cubic contents of the excavation as it actually was;
as it was called for, but as it was blasted out or fell down or slip
in or whatever?—A. No, sir; I can't tell that. That can only be as
tained from the cross-sections for the lining. They give the exact
cavation. But we did not allow for the entire excavation; there

onsiderable outside of that that was not allowed for. But the actual xcavation may be determined by referring to the sections.

Q. Do you know how much excavation was allowed for to the contractors in excess of the normal section?—A. No, sir; I think they were only allowed in Champlain avenue; the two slips that occurred here, one at 3 plus 72 and the other at 8 plus 15 to 8 plus 46; they were allowed for those slips. During the suspension of operations I made a trip through the tunnel and measured up the stone that had fallen on the floor of the tunnel and allowed that; that was a mere trifle; and those were the only excavations that were allowed while I was there, outside of the side lines. In fact, at 3 plus 72 that slip was allowed for before I came; that was under Mr. Partridge; I think 130 odd cubic yards were allowed for.

Q. Do you know about how many cubic yards were allowed for in excess of the required lining?—A. I do not think it would amount to over 300 at the outside, including that big slip. That is my impression.

Q. When did you leave the work?—A. I left the work February 15, 1888.

Q. That was during the time of suspension?—A. Yes, sir.

Q. How long had the work been suspended at that time?—A. Two or three months.

Q. From the fall before, I suppose?—A. Yes, sir. I was relieved at the instance of Lieutenant Townsend. I received a letter February 11, 1888, from Major Lydecker, notifying me that my services would be dispensed with as assistant engineer after the 15th; that was just four days' notice. That letter was written on Saturday, and I only received it on Monday, so that only gave me two days' notice. Do you desire me to read Major Lydecker's letter?

Q. Does it give any reason?—A. No, sir. I wrote to Major Lydecker as soon as I received the letter, and desired to know the reason. He never replied to that letter. I then went to Lieutenant Townsend, who put in an appearance shortly after that. I asked him the reason. I knew that it came from him because we did not get along very well on the work, because he had certain views as to carrying on the work which were not exactly correct, as far as engineering principles were concerned; and he said, "Because you abstracted a paper from my desk." I said, "What paper did I abstract?" "Well," he said, "you abstracted one of my reports." I said to him, "Lieutenant, I want you to understand that the paper you have reference to contains data of my own, that was not given to you officially. The information contained in that paper is in the possession of this office, but it was simply my data; and I had a right to it for the purposes of copy." This report in question I gave him three months prior to the time I was dismissed. I gave it to him voluntarily. He took it in his office and looked it over, and allowed it to remain on his office desk. It was there nearly three months. I was taken sick during the time, had a bad cold, and I had to go home. I always tried to keep a record of my notes; always have done so as well as I could. I have taken my estimates home night after night, while I was employed on that work; and I took that paper with me to make a copy of it, which copy I have.

Q. What was the paper? Have you the very paper?—A. I have a copy.

Q. Where is the original?—A. The original is in the office. I brought it with me to return that day, and I had placed it in my desk.

The CHAIRMAN. Let us see the copy.

The WITNESS [producing paper]. This is an exact copy of it, exactly as

you see it. It was not addressed to Lieutenant Townsend at all; it wa not turned over to him officially; it was simply data of my work; ever thing contained in there was contained in my reports and estimate The estimates in here I got up the first of each month. This was Sep tember 20, 1887.

Q. This paper reads, at the top, "Estimate of September (total est mate);" then below, "East shaft, west drift, September 20, 1887; e cavation." Then it gives the number of the station, the factors in tab ular form, cubic yards, cubic yards another column, and mortar. The follow the various figures which are the elements of that work, I sup pose?—A. Yes, sir.

Q. Then follow estimate of Champlain avenue shaft, east drift, exca vation, same date, with the same sort of tabulation of figures; then o the next sheet under the same heading is entered rubble masonry, giv ing the total number of cubic feet at that time; that is reduced to cubi yards, minus previous estimates. Then follows a note about deductio for some possible error in the west heading, east drift.—A. While was sick Mr. Smead made up the estimate, and, not fully understandin it, he allowed more time than I would have allowed. I always deducte not only the 10 per cent., but I kept off a certain number of cubic yards in order to be on the safe side; but he had allowed it in the estimate and I had to make that note to have it deducted.

Q. Then follow estimate of concrete, less previous estimate of amoun due; then come computations about the number of brick masonry, an the total to September 30, less previous estimates; statement of amoun due; diminutions by overestimates in east shaft of west drift. The follow estimate of Champlain avenue, west drift, same date, excava tion, factors, and stations. Then Rock Creek, east drift, same excava tion, with stations, factors, and cubic yards computed. Rock Creek west drift, the same, with a footing of totals, and computation of num ber of cubic yards to be paid for. At Rock Creek shaft, west drift brick masonry with computation, deducting privious estimates. The Foundry Branch, east drift, excavations, with the same statement as t the stations and factors. Foundry Branch, west drift, excavation, wit the same statement of tabulated stations, factors and computation Foundry Branch, west drift, computation of station and brick-work figuring out the number of yards due. That was the whole of the pa per which Lieutenant Townsend said you had abstracted?—A. Yes, sir

Q. You say you took it, it having lain there. Was it on his desk o in his desk?—A. It was on his desk. It had been the habit, when Captain Symons was there, to take my papers, and I took them away at any time I felt disposed. But Lieutenant Townsend, feeling so sore because I dissented from his absurd and impracticable plan for carry ing on that work, took this means of——

Q. When did he come there?—A. He came there the 8th of May 1887.

Q. He was your superior officer?—A. He was my superior officer yes, sir.

Q. Will you tell us precisely, and as briefly as you can, what these points of difference were, between yourself and Lieutenant Townsend in regard to the work?—A. Shortly after his appointment as super vising engineer of the work he made alterations in the standard section of the work, the horse-shoe section; that is a section composed entirely of brick, the top, sides, and the bottom. He made a plan, first, to dis pense with the invert masonry, and construct the side-walls vertically with brick. I protested against that, because there are seams in the

ttom, the same as the roof and sides, and under pressure water will n out and escape. He then experimented in the tunnel at various aces, Champlain avenue drift, Rock Creek drift, and Foundry Branch st drift. He proposed to put in a segmental arch without side-walls invert masonry. I told him that we could not excavate for it be-use the rock was so fissured that in places it would blow to the ttom. He studied Drinker on Tunneling. I invited him to come wn and make an examination of the rock itself to see whether he uld put in a segmental arch. We were there together at various nes, and I pointed out to him and showed him the fissures in the rock, d told him that it was impossible. But he went ahead. He exca-ted in Rock Creek east drift 105 linear feet; at Champlain avenue st, 65; at Foundry Branch west, 30; total, 200 feet.

Q. What was that excavation?—A. That was excavation for the gmental arch. He had to abandon that arch.

Q. Describe particularly what you mean by a segmental arch.—A. segmental arch is supposed to support the roof and rest upon the tural rock of the tunnel.

Q. Not at the bottom?—A. No, sir.

Q. But part way up?—A. Yes, sir; part way up, and to form a skew-ck on this rock, and put in a lot of brick-work above to support the of.

Q. What you mean by a skew-back is a footing already blown part y up on the side, on which the foot of the segment can rest?—A. xactly; that is it.

Q. How did his excavation turn out in regard to getting that skew-ck?—A. The side walls blew to the bottom in nearly every instance, d he abandoned the plan.

Q. He could not get any skew-back that way?—A. No, sir. He went measuring, and he found that he had put in considerable more space, d if you put in a segmental arch you would have to put in a side ll to support it.

Q. When was that, when he had finished the excavation of the num-r of feet you have mentioned and with the result you stated?—A. the report of August 6 he terminated in Rock Creek east.

Q. When did he come to an end, as nearly as you can tell, of this periment for a skew-back?

The WITNESS. When he abandoned it?

The CHAIRMAN. Yes.

The WITNESS. The trimming for segmental arch stopped August , 1887.

Q. What was the width of that skew-back to be as contemplated?— . The width for the standard sections is 12 feet from out to out.

Q. But I mean the width on which the segment of the arch would st.—A. Fourteen feet.

Q. No, you do not understand me yet. I want to know what width e side walls made, the width of this skew-back on which a foot of the gment would rest.—A. Fourteen feet.

Q. You do not understand me yet. How far would he have to blast at the side to get a rest for that skew-back for the lining of the ex-vation as it was to be?—A. Of course he attempted it then in the rmal section of 11 feet; that leaves a foot and a half on each side.

Q. But in point of fact, you say it all came down and blew out to the ttom?—A. Yes, sir.

Q. You have seen it I suppose, where it was blasted, have you not?—

A. I have been in there with him, and after making these excavati
we measured and found that he did not have any place to put his sk
back on.

Q. How much rock had been taken out from the normal sectio
these places where the experiment was performed? State in ro
numbers unless you have the exact figures.—A. There were about
cubic yards of excavation.

Q. In the 200 and odd feet?—A. Yes, sir; about that. Then to
place that space unnecessarily excavated it would take about the s
number of yards of rubble masonry.

Q. Did the contractors do that excavation?—A. Yes, sir; I bel
they made a claim for it, but it was never paid to them.

Q. You say this project was abandoned or ended in August, 188
I understood you correctly?—A. That is at that one point.

Q. I mean the very last one, wherever he tried it last. I wante
get the time when the skew-back matter was ended, in point of e
vation?—A. August 18, it was. That was in Foundry Branch
Rock Creek east; it may have been a little later in the other drift.

Q. Were there any other points of serious difference between y
self and Lieutenant Townsend?—A. He was working on theory
tirely. He would come in with different schemes of carrying on
work that were absurd.

Q. He might differ from you as to whether they were absurd.
us what they were.—A. He thought it would be a good idea to
pense with the masonry lining entirely and timber the entire tunn

Q. What do you mean by that?—A. To save the expense of li
he thought he could timber the tunnel without lining it; he thou
that was a good idea. I told him that the idea of timbering was
temporary, to support the rock to keep it from falling till we could
in the masonry. Then I explained to him, but he didn't appear to
prehend at all, that this was to be a water tunnel, that it was to
work that was to be entirely dry. He evidently did not understand
enormous pressure that was to come in that work.

Q. That was upon the idea that the rock itself that were held up
falling in would hold the water for the purposes of the tunnel, w
not?—A. Indeed, I don't know. His object was undoubtedly to
the expense of lining. Of course you could put in timber much che
than you could brick masonry.

Q. Were there any other serious points of difference as to the man
ment of the work between you and him?—A. Well, yes. I had a
versation with him in regard to Chief Inspector Kirlin. They appe
to be good friends, and I did not think Mr. Kirlin was attending str
to his duties; that is, I never saw him get up on the scaffold or exa
into the work, and I told Lieutenant Townsend that I thought $1
month, instead of the $175 a month that he was receiving, would
him very well for his work.

Q. When was that?—A. I don't know the exact date, but it wa
the course of conversation.

Q. About what time of what year?—A. That was not long
Lieutenant Townsend came in, in 1887.

Q. That was some little time after Lieutenant Townsend cam
there?—A. Yes, sir.

Q. Your point was that Kirlin ought to be paid less?—A. Yes, s

Q. What was Kirlin's duty at that time, in the summer of 1887?
His duties were the same as they were when he first took charge o
work, up to the time it was suspended, supervising; he was the

pal inspector of the line, to examine the work and examine the inpectors.

Q. When did the work of lining begin after you came there, and here?—A. It was shortly after, in December, I think, that the first ning was commenced. The first lining was in the west shaft, that is, he east drift of the west shaft, and then they commenced at Howard Jniversity.

Q. Stick to the west shaft for a moment. You stated, I believe, that he rock there was all rotten?—A. Yes, sir.

Q. What kind of lining was put in there?—A. That was brick-work, hree-ring brick-work, and invert of masonry.

Q. Invert of stone?—A. No, sir; of brick.

Q. All brick?—A. All brick.

Q. That place, then, was lined with masonry, top, bottom, and sides?—A. Yes, sir.

Q. How was the packing done?—A. Dry.

Q. Did you have any occasion to observe or suspect at that place at that ime any imperfection in the packing?—A. I think I only noticed one lace where the packing was put in exactly right. Mr. Chadwell was ispector, and I think I called his attention frequently to it while I was here, but it didn't amount to very much. That was all timbered at last, nd I had the timbering taken out; after the timbering was taken out, n fact it had to be filled entirely to the roof, and I recollect a circumstance here of calling his attention to the fact that I noticed that it was ntirely packed, but I suppose no doubt he would have seen it later on.

Q. Is that the only instance you observed, or knew, or heard of, or uspected of any bad work in the packing at that extreme west end?—A. Yes, sir; at that extreme west end.

Q. I believe the contract at that time, under the then existing arrangeient, called for dry packing?—A. Yes, sir.

Q. Now, come to the next place where lining went on; that would be Foundry Branch, the west heading, would it not?—A. Yes, sir. They idn't line in that tunnel at that time; it was sometime after that. They commenced lining at Howard University at the shaft; I think it as the 14th or 15th of December that they commenced lining the haft itself at Howard University; that was the first.

Q. Then go on to the lining of the tunnel.—A. Then they lined laces in the tunnel.

Q. Different places?—A. Different places.

Q. Not yet intending to line it all?—A. No, sir.

Q. What kind of lining was that?—A. It was all dry packing.

Q. That was what the contract called for?—A. Yes, sir.

Q. Did you discover any imperfections in that packing?—A. There ere imperfections in the brick-work. They were using bats there instead of whole bricks, I noticed in some places, and I called attention o that fact; I called Mr. Chadwell's attention to it; he was inspector, nd he was removed by Captain Symons. I reported him to Captain Symons, as appears in my report of operations for the month of June, 885. I said that the lining brick-work had progressed slowly and not ltogether satisfactorily; too many small or broken bricks were used, hich made the work weak, joints not being properly protected. Mr. Chadwell, the inspector, whom I had believed to be faithful to the interests of the Government, and had performed his duties to the best of is ability, has not the requsite knowledge to detect badly-laid work.

Q. Now, about the lining of the packing.—A. The packing was masonry laid dry.

Q. Did you discover any imperfections in that?

The WITNESS. In the packing?

The CHAIRMAN. Yes.

The WITNESS. I recollect I used to call attention frequently to t dry packing, to the way it was being laid, but I can't recollect any pa ticular time. I always examined the work when I was in there, and I noticed anything that was not right I would call the attention of t inspectors to it.

Q. What was the nature of these imperfections that from time time you noted in the dry packing?—A. The stones not being proper laid, that is, they would have a rocking motion in the bed of ston In using dry-stone packing it is very necessary to build it very car fully, because when the pressure of the water comes in there if there any settlement in the work it is apt to rupture the arch. That was t only thing I noticed particularly that would not perfectly solidify tho stones.

Q. Did you notice any instances of spaces being omitted and n filled?—A. No, sir. That is, I haven't any recollection now of anythi of that kind. As far as I know, I think they did honest work, so f as filling the voids was concerned.

Q. You are now speaking of the dry packing?—A. Yes, sir.

Q. When was the dry-packing system abandoned?—A. I think t supplemental contract was entered into between the Government an the contractors October 24, 1887; I think from that time on rubble m sonry has been used.

Q. Preceding that contract for rubble masonry had you made an report adverse to dry packing, or had you had any discussion with yo superior officers on the subject of dry packing being insufficient?— My ideas were that it was not as good as the rubble masonry.

Q. I am not asking you at this moment for your ideas; I am askin you whether anything took place in the way of any report from you, statements made by you, or discussions between yourself and yo superiors, before this subcontract for rubble masonry packing w made?—A. I think so; I won't be positive; I think there was son discussion.

Q. You do not know, then, with certainty how the change came be adopted, from dry packing to rubble-masonry packing?—A. A boa of Army engineers inspected the tunnel, and they recommended the u of rubble masonry instead of dry stone packing.

Q. What circumstance happened that led to this board of Army e gineers being sent there at all?—A. I think it came up through Lie tenant Hoxie; that is my recollection.

Q. Was Captain Hoxie there at that time?—A. No, sir; he thoug the lining should be of concrete masonry, throughout.

Q. And that led to an inquiry by a board of engineers?—A. Ye sir; and they recommended the stones being laid in cement.

Q. Will you not describe to us what your understanding is of co crete masonary that Lieutenant Hoxie, as you understood, thoug ought to have been used?—A. His idea was to build the arch an walls and backing with concrete, composed of broken stones 2½ and inches in diameter, and forming a concrete by mixing it with cemen and form that into the arch.

Q. Did you ever hear it described how that concrete was to be mad to stay there until it got set?—A. No, sir; I don't think any one cou explain how it could be placed there. In the first place, the water wa percolating through the cracks and that would have washed the cemen

material out; and then the concrete would not have been of much unless it was thoroughly solidified. It should have been laid in rs of about 6 inches and thoroughly rammed. But there is no of ramming it in the space between, because it was too confined; re is a space there probably of not more than a foot above the arch, ere it wouldn't be possible to ram the layers. They would have to horizontally, and in doing that they would only work the cement They could not have constructed it in that manner.

. The rubble-masonry lining having been agreed upon, where did rubble-masonry lining begin, first in point of time?—A. At How- University, about 2,000 feet from the shaft, I think, they commenced.

. Were you there then?—A. Yes, sir.

. Who was in charge under you? Who was inspector? Was it lin?—A. Kirlin came shortly after; the 15th of October, 1886; you ht say a few weeks after that commencement.

. Was that 1886 that he came there?—A. He came the 15th of Oc- r, 1886.

. That is when the rubble masonry scheme was first put into oper- n?—A. I think so.

. How much rubble-masonry packing was done altogether while were engineer?—A. (Referring to paper.) The total length of the was 8,767 feet.

. In how many different places?—A. In east shaft west drift; I can it in stations if you wish.

. Give the stations.—A. Station 3, plus 18 to 7 plus 46, 428 feet; 9 46.8 to 33 plus 17.1, 237.3 feet; total lined, 2,798.3. Champlain nue east drift, 0 plus 77 to 2 plus 27, 150 feet; 29 plus 68 to 33 plus 380 feet; total lined, 530 feet. Champlain avenue west drift, 0 plus to 20 plus 62, 1,984.6 feet total lined. Rock Creek east drift, 18 50.5 to 31 plus 21.5, 1,274 feet total lined. Rock Creek west, 16 84.7 to 22 plus 39.3, equals 554.6 feet; 22 plus 39.3 to 25 plus 74.8, als 331.5 feet; 31 plus 53 to 33 plus 63.5, equals 210.5 feet; total d, 1,100.6 feet. Foundry Branch west drift, 8 plus 79.6 to 10 plus equals 205.4 feet; 1,085 to 11 plus 97.6, equals 112.6 feet; 11 plus to 13 plus 29.6, equals 132 feet; 17 plus 80.5 to 22 plus .08, equals 5 feet; total lined, 877.5 feet. West shaft east drift, 0 plus .07 to lus .09, equals 202 feet total lined. Résumé: East shaft, total, 8.3; Champlain avenue east, 530; Champlain avenue west, 1,984.6; k Creek east, 1,274; Rock Creek west, 1,100.6; Foundry Branch t, 877.5; West shaft east, 202; grand total, 8,767 feet.

. How were all these various patches, so to speak, of brick lining at their termination; each patch by itself? Was the brick-work jutting out from the rock, or was it chambered in, so as to make a inuous surface from the brick to the rock?—A. In the east drift of west shaft it was supposed at that time to terminate at that point, then it was to run at an angle to the side-walls, a kind of short g-wall, probably 3 feet in length.

. Now the other ones; and state in general whether they were left f the work were to go on, or were they brought to a coincidence with regular wall?

he WITNESS. At this time?

he CHAIRMAN. Yes, when you left it. All the others were left in a sical condition as if the farther lining was to be carried on from e points.

he WITNESS. Exactly. Now I may say with regard to the east drift he west shaft, I gave 202 feet; that is the total length of that drift.

I was speaking of a time, a long time ago, before they had resume operations at all.

Q. I was speaking of the time that you were there; that is all wanted.—A. There was no angle at the end at all.

Q. Who were the inspectors at those various places where this linin was going on during the time you were engineer?—A. In Howa University there was Mr. F. A. Harper, who had charge of the da force. Do you want the names of all who have been connected wi the work?

The CHAIRMAN. Yes; those who were connected with the work du ing your time.

The WITNESS. Mr. Thomas Lucas had charge of the middle se tion in there. He had charge of the construction of the shaft. The Mr. Francis Hutton was there a short time as inspector; he was a you man, who was not familiar with that kind of work, so he was taken of of that kind of work and put on the engineer corps to take measur ments above ground.

Q. How did he come to be there at all?—A. He was appointed, think, by Captain Symons.

Q. Did you have anything to do with his appointment?—A. No, si

Q. Name the other inspectors who were there during your time?—A Mr. Chadwell was there a short time.

Q. He is the one you have already mentioned as having been di missed?—A. Yes, sir; and then there was Mr. Nicholas Harper. Thos are all that I can recollect. In Champlain avenue east Mr Lucas wa the only inspector; they had only constructed a short distance unde him. In Champlain avenue west there was Mr. Lorenzo Lucas an Mr. Thomas Lucas; I think they were all at the time I left.

Q. Does that cover all?—A. I think so. Mr. Boyce may possib have inspected some of the work at the western end, but I am no positive about that.

Q. Did any of these inspectors during your period of time there d any service for the contractors?—A. Not to my knowledge. The que tion came up, I recollect, in regard to Mr. H. M. Woodward, who wa day inspector in Rock Creek east; he was formerly, I believe, the tu nel inspector; he was appointed by Major Lydecker. Colonel Kirli wanted him to remain over hours, and he came to me about it. I tol him that nine hours was the stated time; that he was only paid $75 fo that period of time, and that he was not to work beyond that time, o allow the men to work. I went to Colonel Kirlin about it, and he sai it was all right for him to work and be paid for it—a certain amount I think it was $15 he mentioned.

Q. Per month?—A. Per month, yes. I wrote to Major Lydecke about that, and I really would like to have that letter produced.

Q. About what time was that?—A. That was February, 1887.

Q. What was the nature of the letter?—A. It was in regard to th men working overtime.

Q. You may state the substance of it.—A. I am not positive abou that. That letter is in the office. This is the reply I received, unde date of February 3, 1887.

Q. Read the reply.—A. (Reading:)

WASHINGTON, D. C., *February* 3, 1887.

SIR: I can not consent to the purpose of the contractors to work the lining for in shifts of eleven hours each, because I am satisfied that no men can be counte upon to work such long hours in the tunnel and turn out good substantial masonr

as we demand for the lining; nine hours, in my opinion, should be the maximum
od during which any one shift of masons should be allowed to work. You will
e the contractors to act accordingly.
Very respectfully,

G. J. LYDECKER,
Major of Engineers, U. S. Army.

r. GEORGE H. CORYELL,
Assistant Engineer, Washington, D. C.

hat letter I showed to Colonel Kirlin and the contractors.
. Did you see that those directions were carried out?—A. I gave
n notice not to work overtime and told Mr. Woodward and Colonel
lin. I showed it to Mr. Woodward down there at one time in the
sence of Colonel Kirlin. I told Colonel Kirlin that he must see that
men did not work over nine hours a day, and the men did not work
r nine hours, so far as I know, while I was connected with the work.
. Did any of these inspectors of the masonry lining and the pack-
thereof ever report to you any imperfection in the rubble masonry
king?—A. At one time only. It appeared that Mr. Daniel McMaugh,
acker in the Rock Creek east drift, put in dry work instead of rub-
work, and he was reported to me by Colonel Kirlin. I asked Mr.
odward to go to the office and report. Mr. Woodward said that
Maugh put the work in after he (Woodward) had left the work,
r his hours were over, after 4 o'clock; that Colonel Kirlin discov-
l it and he made complaint. I told Mr. Woodward that he must
allow the men to work overtime; that he must be more careful
he future; that he must watch the work more carefully. I discharged
iel McMaugh and a short time after that I received a letter from his
ther, with no date to it, but it was received in January, 1887. The
er is as follows:

GEO. H. CORYELL:

R: With reference to the mason whom you ordered discharged from Rock Creek
ve inquired into the matter and am satisfied he had not any intention of slight-
he work; but I find there was a misunderstanding between him and the laborers.
e had occasion to go on top and told them to go to the heading to get a couple
ars of small stone until he would come back. Instead of doing this they got
one's men to dump a load of all sizes and they started throwing them behind the
and put mortar on them.
e says when he got back he met the inspector. He told him to get his trowel and
up some of the work on that side. The inspector asked who did this work; he
it was not done, that the laborers had been throwing in stone when he was on
then the inspector told him to leave it there as it was and not touch it. So now,
Coryell, taking a fair view of the matter, I think you will agree with me in say-
he had not any intention of slighting the work.
ood bye. Yours, with respect,

B. W. MCMAUGH

. Do you know where the brother of whom this letter was speaking
is?—A. No, sir; I do not. This man was not re-instated. I told
Kirlin that he could not come back on the work. He was em-
yed, however, after that on the work.
. During your time?—A. Well, I think probably he may have been
re during my time. I will not say positively about that. Mr. H.
Woodward informed me that he was at work there.
. When did Mr. Woodward inform you? Was it while you were
work there or since you left?—A. Since I left. I inquired of Mr.
odward in regard to this man.
. Do you know whom the inspector was referring to in the letter
have read?—A. No, sir.
. Did you not know at the time who should have been the inspector
hat work?—A. Mr. Woodward was the subinspector of that work

and Mr. Kirlin was the chief inspector; I don't know whether he r ferred that to Mr. Kirlin or to Mr. Woodward; he don't state.

Q. Was there any other instance where bad work in the rubble m sonry packing came to your knowledge?—A. That was the only tim that there has ever been referred to me any question about bad wor by Mr. Kirlin or any of the other inspectors during the whole time.

Q. During the whole time you were there, while the rubble mason packing was going on in this length of lining that you have alread described, did you yourself see or hear of any bad work, except the i stance you have already named?—A. No, sir; I was really confined the work of cross-sectioning the tunnel and I couldn't give it very clo attention. I protested all the time against cross-sectioning the wor When they started the lining, after I came, the inspector made th cross-sections, and the computations were based upon the sections the work. I was in the tunnel at work with the instruments and n other work, so that I couldn't possibly have done that cross-sectionin and I wanted an engineer, specially appointed for that work, to mak it his business to cross-section and make the computations of the wor because the system of cross-sectioning was the rectangular system an it required good judgment in taking the sections by that metho which I do not approve of. I wanted the system taken by the angul method; that is, wherever the break in the rock is over a certain poin take the angle and measure to that point and the distance made. I the rectangular system it is possible that when you measure in ordinat you will not strike one of these apexes of the rock. In doing so, to giv the proper quantities, you have to guess at it to a certain extent. Yo have to exercise good judgment. For instance, if it measures at th crown of the arch, say, 2 feet up to the rock, and then a point 2 fe from that is measured up, and between these two points there shou be another point higher still, you would have to exercise judgment making an allowance. Consequently, I condemned the rectangular sy tem for measurements. I asked Captain Symons to appoint an engine for the work, and after he left the work I went to Major Lydecke Major Lydecker wanted me to take the cross-sections by the recta gular system. I made a diagram, showing him the difficulties of ta ing by the rectangular method, and I wanted him to adopt the angula but he thought the rectangular was the best plan. He, however, a pointed Mr. R. C. Smead, December 15, 1886, to take the cross-sectio of the tunnel. Shall I read his appointment?

The CHAIRMAN. Yes.

The WITNESS (reading):

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., December 15, 1886

Orders.—(1) Mr. R. C. Smead, assistant engineer, is assigned to duty on the Aqu duct tunnel, and is charged with the work of measuring, by accurate cross-sectio all that part of the same west of Champlain avenue shaft. He will act under t immediate orders of Mr. George H. Coryell, assistant engineer, and render week reports, which shall include detailed drawings showing the cross-sections made a all figured data in relation thereto.

(2) Mr. E. H. Kirlin, supervising inspector of lining on the aforesaid part of t tunnel, will make report of weekly progress concerning the work which has be placed under his immediate supervision, in such detail as to cover all matters of i portance relating thereto, together with his recommendations concerning the san He will see that subinspectors on the work of lining, in that part of the tunnel co mitted to his supervision, are faithful and competent in the discharge of their duti and that all orders of the assistant engineer in charge are duly observed.

(3) All reports, as above directed, will be submitted to and transmitted by Mr. Geor H. Coryell, who is hereby confirmed as the first assistant engineer and representati of the undersigned in all matters relating to the operations on the tunnel. He w

mit these reports, with his remarks thereon, in time to reach this office not later the Tuesday following the week to which the report relates, including in his letter ansmittal a résumé of the work done, and his recommendation as to its further ecution. Daily reports concerning operations in the tunnel east of Champlain ue will be rendered as heretofore, and the supervising inspector of lining west hamplain avenue will submit daily a report of the force engaged thereon.

G. J. LYDECKER,
Major of Engineers, U. S. Army.

py for information of Mr. George H. Coryell, assistant engineer.

is system of cross-sectioning was the rectangular system.

. I understand you to mean, then, that during all the time you were e and while the rubble-masonry packing was called for and going the only instance that came to your knowledge, either by sugges- or as a fact, of bad work was the one you have mentioned, when Iaugh was discharged?—A. The only time.

. And how many lineal feet, do you think, in round numbers, of ble-masonry packing went on while you were assistant engineer in rge?—A. I think over 8,000 after Mr. Smead was assigned to other es in the latter part of February.

. Who did the cross-sectioning then?—A. Then I was ordered to the cross-sections of the work. But I was taken ill shortly after . I was laid up with acute muscular rheumatism and confined to bed, on account of exposures I had had on this work, where I was ected to great differences of temperature and to the influence of water in the tunnel; I had been repeatedly drenched through and ugh, and all that commenced to tell on me. I was confined to my for several weeks, and for over two months I was unable to perform duties whatever.

. During that time, who took your place as engineer in charge?—Mr. Smead took the cross-sections at that time. When I was able et up I resumed the work of taking the cross-sections.

. Did Mr. Smead take your place as engineer in charge, as well as aking the cross-sections during that time?—A. I do not know what rders were in regard to that.

I think you have said that you did not know of any inspectors g work for the contractors during this rubble-masonry time?—A. only time my attention has been called to any work was at that in Rock Creek east.

I am now asking, after the rubble-masonry scheme was adopted, ther during that time, when the work was going on, you knew or d of any of the inspectors doing any work or service for the con- tors?—A. No, sir; if I had I would have had them discharged or d have called attention to it.

Did you know or hear in any way of their receiving any money, or r valuable thing, from the contractors or anybody else, except United States salary?—A. Never; no, sir. The only knowledge ve in regard to that is what I have seen in the papers.

Did you know during that time of any overtime being occupied, than the nine hours, on the shaft?—A. I have no recollection of one working over hours on the work; no knowledge in any way.

And, if I understand, the orders were that they should not work time?—A. The orders prior to that time and subsequent to that were that they should not work overtime.

Did you never have any suspicion, during that 8,000 feet of rubble nry packing, and during the time that it took to do it, that the ing might not be going along in the right way?—A. I never had lightest suspicion that there was anything wrong going on. It never

occurred to me. I could not understand how the inspectors could ne lect their work or how the men could do their work without doing thoroughly. When I was in the tunnel I would make an examinati of the work, as well as I could under the circumstances, and everythi appeared to be going on all right. I have called the attention of Maj Lydecker to bad work in the tunnel, and have recommended to him t dismissal of inspectors where I had noticed myself that bad work w done. When I would notice bad work I would generally call the atte tion of my superior officers to it.

Q. But I understood you to say just now that, aside from the on instance you have mentioned, when McMaugh was discharged, y never had observed any bad work.—A. Not in the rubble masonry, b in the brick-work.

Q. What were those occasions, and what was the nature of that b work in the brick-work?—A. This is the letter I received from Maj Lydecker under date of November 15, 1886:

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., November 15, 1886

SIR: I have this day appointed Mr. E. H. Kirlin as principal inspector of lin for that portion of the tunnel extending from the bottom of the Champlain aven shaft westward to the western end of the tunnel. You will please supply him w a statement indicating the limits of such parts as have been selected for lining, a the cost of which was comprised in the estimate on which the last appropriation the work was based; also make an inspection of that part of the tunnel and indic to him the places included in the statement.

Very respectfully,

G. J. LYDECKER,
Major of Engineers, U. S. Army

Mr. GEORGE H. CORYELL,
Assistant Engineer, Washington, D. C.

Q. That is not in answer to my question.—A. I am coming to that

Q. Suppose you answer the question first, and then give your e planation afterwards.—A. Well, I detected bad work in Champla avenue west.

Q. What was the nature of the bad work?—A. The nature of t bad work was that the work was not properly bonded; they had co nected the work, and there were joints there for six or seven cours without being broke, as they should have been. I called the attenti of Major Lydecker to it. I went down in the tunnel with him a showed him the bad work. Mr. Kirlin was present, and Mr. Healy think, superintendent, and Mr. Schaeffer, an assistant at that time, a several others. Major Lydecker saw the work and he said it was ba I then told them to take it out and rebuild it. This was under t supervision of Mr. Kirlin, and at that time the only work being carri on in the tunnel was in that drift, I think; that is, I mean west Champlain avenue. We went further in the tunnel to station abo 1800, I think, under Mr. Lucas. I pointed out to him where he w laying two rings of brick instead of three, as the specifications call for. I also called his attention to the joints in the brick-work being t thick.

Q. What Lucas is that you are referring to now?—A. That is I spector Lucas. Mr. Kirlin was there also. He ordered them to ta the work out, so that three rings could be placed, and spoke to M Kirlin about it.

Q. How much distance was there where two rings instead of three h been laid?—A. I don't recollect. I think it was 8 to 10 feet, probabl may be less.

Q. Not yet covered?—A. Not yet covered. After that I found bad ork on the part of Mr. Lucas on the same drift.
Q. In the brick masonry?—A. Yes, sir.
Q. What was the nature of that?—A. Two-ring business. I went to ajor Lydecker and asked him for his discharge. Major Lydecker asked e to put my recommendation in writing. There had been precedents tablished under Captain Symons that I was to report to them and he ould have the men dismissed at the time. He had never required me put my recommendation in writing before, and at this time I didn't care put this in writing. I thought he should accept my word, as he never ent in the tunnel himself, you may say, to make an inspection of it, d so of course he had to depend on me, and I thought if he could not cept my word I would not put my recommendation in writing.
Q. Was Lucas discharged?—A. No, sir.
Q. Did Lydecker, to your knowledge, make any investigation on the bject in that particular instance?—A. No, sir; he did not. He con- nued on, and has continued on nearly up to the time that the work osed—this last work.
Q. State any other instances of bad work falling under your observa- n.—A. Well, I have repeatedly had bad work torn up, badly-laid ick-work.
Q. Under what inspector?—A. Under various inspectors. I couldn't ention any particular time. I have often ordered out the men while ey were at work on the brick; sometimes three or four courses I have dered out. I recollect one instance where one of the brick men was ing the brick without first placing the mortar on the brick, and after e brick was laid he would fill up the joints between the brick. I anted the operation performed at one time to put the brick on so that would insure the joints being embedded in cement. So I was not sat- ied, and I tore up six or seven courses to see if there was any mortar der them, and see whether they were properly laid below the courses at I had noticed, and I found there was not enough mortar in the nts, that is, the mortar was not sufficient, and I called attention to and told him he must do it right or leave the work. I don't recol- t ever speaking to a workman twice about bad work. I gave posi- e instructions to the inspectors that they must be rigid with their rk and see that it was laid properly.
Q. What advantage would it be to anybody to lay two courses in- ead of three?—A. The advantage was, I suppose, that they could ake better time in putting in two instead of three, and then it saved e expense of taking out the rock. It would never have done to ad- t three-ring work.
Q. They were paid more, were they not, by the contract, for three gs than for two?—A. They were paid for three-ring brick while I s there; that was the only kind to be laid under the contract.
Q. Then if they put up two-ring brick, that would be a fraud upon the overnment in point of pay as well as on account of the weakness of e structure?—A. Yes, sir; they would get more quantity of work an they were entitled to.
Q. Have you now mentioned all the instances within your recol- tion?—A. I would like to read these letters.
Q. Just answer the question: Have you now mentioned all the in- nces, within your recollection, of bad work which you observed or ard of during the time you were there?—A. Yes, sir.
Q. How often did you go in the tunnel?—A. You may say I went in arly every day. I prepared all the estimates of work and made onthly reports.

Q. Did you compute the cross-sections after you had taken them
A. No, not all the time; I hadn't time to do it.

Q. You had a clerk or assistant or somebody?—A. I didn't have clerk. The cross-sections would be computed by the draughtsmen so times, or by Mr. Bailey, or by Mr. Smead.

Q. Did you have regular hours in the day-time for going into tunnel?—A. No, sir; I would go in at any time.

Q. Then the men at work would not know when you were expec to be in there?—A. No sir; they would not know.

Q. Then, supposing that long distances of actually vacant places and around the brick masonry are now found to exist, that were pu there or were left there during the time when you were in there al every day, and went in at odd times so that the men did not know w you were coming, how could these frauds have been committed with you observing them?—A. Well, you see my duties were, you may the greater time, the same as Mr. Bailey's, that is, to cross section work. But I would notice the work as well as I could when I woul taking the cross-sections; and when I would be taking cross-secti they always knew when I was coming in, because Mr. Kirlin was alw aware when I was coming in for that purpose.

Q. That is, he would report to you that further cross-sections w necessary as the work progressed?—A. Yes, sir. Of course they c fix up a bulk-head probably; I don't know as it was done, though.

Q. You have stated that you were in at odd times, but that w you went in to take cross-sections Mr. Kirlin would know when would be expected. Now, take the other times when you went in, wo anybody know in advance when you were coming in?—A. No, sir.

Q. When you did not go in to take cross-sections what did you g for?—A. I went in to measure the work or to fix the grade.

Q. Did you measure the work in any otherwise than by taking cr sections? Did you measure up the length as it progressed?—A. I wo measure that at the end of the month. Mr. Kirlin made reports wee of the progress of the work.

Q. You only measured up once a month?—A. At the end of month that the work was done in.

Q. When you were in at these other times, when even Colonel Ki did not know that you were coming in, how could they have perpetra such frauds, leaving large vacant spaces, without you having see some time or another when you would drop in thus suddenly?—A. I dom went in the west end, that is, between times when I was cross- tioning. At the eastern end, however, that is, at Howard Univers I didn't take the cross-sections there; they were taken by the inspec

Q. Did you go in there from time to time?—A. Yes, sir; I woul in there when I was not taking cross-sections.

Q. Did you take cross-sections in Champlain avenue?—A. Ch plain avenue west, I took cross-sections.

Q. But you have stated that when you did go along there for th various purposes you frequently observed bad work in regard to brick masonry, which bad work you have described.—A. That when I was not cross-sectioning that I observed that.

Q. At what time?—A. At the time of discovering bad work in brick work.

Q. What were you doing?—A. In fact at that time I was not nected with that work at all; I had been dismissed.

Q. I am speaking of the time before you were dismissed, and w you were in charge. That is what I want to get at. While you w

harge from time to time you have said that you discovered bad work
he brick operations, and you described what they were. Now, as-
ing that there are great places left vacant, merely hidden by bulk-
ls that were left at the time you were engineer in charge, and when
time to time you went in there in the way you have described,
did you happen to discover the bad work, in the joints of the brick
being sufficient, and so on, and yet you were unable to see the va-
spaces that were left above?—A. The work I discovered while I
in there was all right. If I had had any suspicion that they were
ing in these bulkheads——

. But you never went in at a time when there was a space so far
on the crown of the arch that it did not look natural and right to
illed, did you?—A. Every time I looked at the work it would look
e solid.

. How recently have you been in the tunnel?—A. I have not been
here since I left the work.

. Then you know nothing of its present condition, as to goodness
adness?—A. No, sir. In regard to Kirlin, I went to Major Ly-
ker and asked him if it was his intention to relieve me of the work
t of Champlain avenue, and he told me that it was; that I was to
ine myself to holing the tunnel.

. What date was that?—A. That was November 16, 1886, I be-
e, that I had this conversation with him. He said that I should
ine myself to holing the tunnel; that I was employed for that pur-
. He said that it was his intention to relieve me of the work west of
mplain avenue. I would not furnish Mr. Kirlin with any data in
ion to that work. I wrote him a letter November 17, 1886, of
h I have not a copy. I would like to have that letter produced,
use it states my reason why I would not furnish Mr. Kirlin the
. He replied to that letter under date of November 17, 1886, in
h he says:

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., November 17, 1886.

EORGE H. CORYELL,
Assistant Engineer, Washington, D. C.:

: I have received your letter of this date in relation to certain instructions con-
d in my letter to you of the 15th instant. As you have failed and refused to
said instructions you are hereby relieved from duty on the Washington Aque-
tunnel, and are required to transfer the Government property in your charge
ll official books and records now in your possession pertaining to the above-
d work, to Mr. R. C. Smead, who will be instructed to receipt to you for the

taking this action I am not unmindful of the services heretofore rendered by
but they can in no manner induce me to tolerate a determined refusal to obey
tten order, which I have issued to secure the most thorough and effective super-
n of the important work for which I—not you—am responsible to the Govern-

Very respectfully,

G. J. LYDECKER,
Major of Engineers, U. S. Army.

urned over the property to Mr. Smead, and as the headings had
been connected between Howard University and Champlain avenue;
because, to a certain extent, I was induced by my friends to make
pology to Major Lydecker and ask to be re-instated, they telling
hat he was waiting for that to come and that he would be very glad
-instate me, and as I had come here under an arrangement to take
ge as engineer and had struck out all the work on the tunnel, of
se I wanted to see the line carried out and the headings holed, and

so I wrote such a letter to Major Lydecker, and Nov. 19, 1886, I recei this reply from him:

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., November 19, 18

SIR: I have received your letter of this date expressing your regrets for ha disobeyed my orders of the 15th instant, and your present desire to comply with t In taking this course you have removed the only reason which made it imperativ me by my letter of the 17th instant to relieve you from duty in connection wit Washington Aqueduct tunnel, and it is therefore with pleasure that I recall th tion then taken and restore you to duty, anticipating that you will now prou comply with the instructions heretofore given you.

Very respectfully,

G. J. LYDECKER,
Major of Engineers, U. S. Ar

G. H. CORYELL, C. E.,
Washington, D. C.

Q. State what your reason was for being unwilling to furnish K with the data, and all that.—A. In the first place, when Major Lyde told me it was his intention to relieve me of those drifts west of Cl plain avenue I told him in my letter, of which I have not a copy, my reason was that I did not think that Colonel Kirlin—in fact I k that he was not a competent engineer, and that work of that should be intrusted to an engineer; that there were other portion that tunnel that were not chalked out by line, and they should be li

Q. By chalking, do you mean making marks on the tunnel?—A. Yes, sir; that there were other portions that required lining. A thought that I should really have charge of that work, defining t points, and have a general supervision of the work. That lette mine, under date of November 17, 1886, will state my reasons for I would like to have that letter read.

Q. You then continued in the service?—A. I was then reinstate of December 15, 1886, in charge as assistant engineer.

Q. And you continued the duties you have already described until February, 1888?—A. Yes, sir.

Q. At which time you were finally discharged?—A. I was fi discharged on the 15th of February, 1888.

Q. I say you continued in the service until February, 1888?—A. sir.

Q. And during this time this rubble packing and masonry lining going on?—A. Yes, sir. I would like, in this connection, to hav records of the court of inquiry produced, because Lieutenant T send there assailed my character, and I think that I have the rig rebut the testimony.

Q. You can make any statement. You know what it was, from ing read the papers, or you may have been present and heard his t mony.—A. He said I neglected my duty; that I was incapacitate work; in fact, that I drank too much; and that two weeks after he appointed supervising engineer he recommended my dismissal fo competency.

Q. That would have been in the year 1887?—A. 1887. I don' for what reason. It was bad enough to dismiss me, but to ma statement of that kind is too bad. I acknowledge that I did d while I was there, but I never neglected my duties. There were t when I would get wet, and I would take a drink, but it never interf with my duties at all. I was at the office every morning at 9 o'cl from the time I went there up to the time I left; even during the pension of operations I was there. Lieutenant Townsend never repo until 11 or 12 o'clock in the morning. Major Lydecker would repo

t 12, and the lieutenant would manage to be there a few minutes
e the major arrived, and he would leave shortly after the major
At one time he came in my office, one afternoon about 2 o'clock,
while sitting there he said "Mr. Coryell, I think you are drinking
nuch, and it will incapacitate you for the work." I said "I do
occasionally." That was the first time he came in, at that time, at
lock in the afternoon of that day. I don't know why he was not
before. I don't think what I drank interfered with my duties.
Were you under the influence of drink at that time?—A. No, sir;
s not. I was attending to my duties in the office.
Had you been recently at any time under the influence of drink
you were on duty?—A. I hadn't been drinking at any time to
fere with my duties in the tunnel. During the suspension of oper-
ns I would drink a little.
You say that he said he recommended your dismissal for incom-
ncy?—A. So it was stated in the paper.
Did he explain whether that incompetency was on account of
drinking to excess or for some other reason?—A. I don't know.
Was your attention ever called, while you were in the service, to
error that you had committed in the course of your work?—A.
ir.
Nothing was ever pointed out to you as being something that you,
ssistant engineer, had done wrong?—A. No, sir; no instance.
Was your attention ever called to any instance where you were
to have failed to do something that you ought to have done?—A.
sir; I have no recollection of any instance of that kind. I always
to perform my duties in a thorough and conscientious manner. I
ed my health in the service of the United States Government. I
ected their blunders in the work, and I have saved the Government
iderable money, and I think I have a right to say that their treat-
of me has been outrageous. They were very anxious to keep me
I had holed the tunnel through for them, and then they were
ng to let me go. I think I was entitled to remain on the work
it was closed, although the way things have turned out since I
ery glad I was not retained. I never received any credit for my
, except from Captain Symons in his report for 1885, where he
ions me very favorably. But after I had brought the headings
ther, and after I left the work, no mention was ever made verbally
report of my services, either by Major Lydecker or Lieutenant
nsend. I resigned a good position to come here, and then those
assailed my character. I am a civil engineer, and of course my
acter as such is everything to me. They can make as many blun-
as they please, and they are only transferred from one place to
her. They are never discharged for drunkeness, doing bad work,
ything else. They have a life-long position.
Is there anything else you know concerning this work that you
not already stated that affects the public interest?—A. I have two
-books there at the office with all my letters in relation to this work
ng the time I was there, and they will show what interest I took in
work. Those letters I have no copies of.
That is an official office copy-book, I suppose?—A. Yes, sir.
That is in the office over at the Georgetown aqueduct bridge?—
es, sir; I was very careful to notice the bad work in the tunnel
had it protected so that the men would not be injured, and several
s I have been nearly killed by the falling of rock in the tunnel dur-
he progress of the work.

By Mr. CLEMENTS:

Q. You stated a few moments ago that you made complaints to M Lydecker against Thomas Lucas and asked for his removal?—A. sir.

Q. Did you ever at any other time make complaint against th spectors or subinspectors or any other of the employés?—A. After time I did not.

Q. Had you done so before that?—A. I had before that made plaint of Colonel Kirlin.

Q. To Major Lydecker?—A. To Major Lydecker.

Q. Did you ask the removal of any one?—A. He was the only o asked the removal of, to my recollection now. I was not satisfied the way he was doing the work in the tunnel.

Q. What was done about that?—A. There was nothing done. W Major Lydecker would not discharge him upon my recommendati never went to him after that, for I thought it was no use. But I h spoken to his chief clerk, in order to reach him; I told him that K ought to be dismissed. Whether the chief clerk ever mentioned matter to Major Lydecker or not I don't know, of course.

By the CHAIRMAN:

Q. Does this profile plan, showing the longitudinal section of tunnel, which you have brought in here, show the line of the tu as it was finally holed through?—A. No, sir; not exactly. There been no alteration made in this profile since it was made. For insta at some of the air-shafts—in fact, at nearly all of the air-shafts—t were advancing more rapidly, so that they would not meet at point [indicating]. So, in order to continue the men at work, the gr would be changed by Captain Symons's order. In fact there ough be a level here [indicating] showing that. I intended, if I had rema on the work and after I had got all the data, to make the alterat in that, to show the actual grade.

Q. But, as laid down here under your direction on the 20th of M 1885, the line representing the line of excavation is not, as reg grade, in all places the true line as it was worked?—A. No, sir; cause we altered it, as I told you.

Q. Does the white part of this tunnel line show where excavat had been made or of the rock still remaining to be excavated?— This really shows the brick-work that has been done. There is noth as regards excavation of sections shown here.

Q. The red shading shows the brick line, does it?—A. Yes, sir. W I left the work that was the condition of the work—8,677 feet.

Q. That was the condition on the 20th of May, 1885?—A. Oh, no had that put on afterwards. I had that put on after I had had profile taken. When I left the work I was anxious to get the li placed in there. This drawing shows the progress each month each shaft, and the total progress.

Q. All this progress was put in after the 20th of May, 1885, w had not been made before?—A. Yes, sir.

Q. And brings it up until the hole was made completely through A. Yes, sir; that is it.

Q. Does this line of the tunnel through the rock show substanti its depth below the surface?—A. Oh, yes, sir. All these shafts [indicating] are the same.

Q. And this drawing shows where you saw soft rock and hard rock A. All this was filled in between the points where we had ascertained

l rock was, and then it was just filled in by guess. When we sunk air-shafts we knew the material at those points, and then the rest t was filled in by guess-work, that is all. When this project first e up about building a tunnel through there they claimed that they d drive the tunnel through homogeneous rock that would not re- e lining, but they had not ascertained by actual data whether they ld go through soft rock or hard rock. If they had taken a few bor- they could have found that data; it wasn't necessary at all to sink aft at such an enormous expense in order to find that out. And if they had found hard rock they couldn't presume that the bal- would be hard. They could have taken borings, that would not e cost much, at different intervals; they would only have cost about 0 a foot; and in that way they could have ascertained the charac- of the material and the stratification of the rock. A few thousand ars spent in that way would have determined that the plan was not ible.

TESTIMONY OF FRANK W. CLARK—Recalled.

WEDNESDAY, *December* 12, 1888.

RANK W. CLARK, heretofore sworn and examined, appeared and red to make the following statement:

he WITNESS. I want to correct a statement I made the last time I here, in regard to the amount of packing used or put in under the contract. Shall I give the quantities I stated at that time?

he CHAIRMAN. Certainly.

he WITNESS. I stated 13,910 yards; it should be 9,808 yards. It is necessary to state how that occurred, is it?

he CHAIRMAN. I think you had better.

he WITNESS. In making the computations I had the figures of the onry, cement, side-walls, and packing for the months of May, June, , and August in the column headed "packing," and in figuring the unt for the months of September and October, which are not esti- ed, I added it in the same column and footed it, making the amount ,910. I found yesterday that I had calculated the brick-work and ide-walls.

On account of your acciden tally having placed the brick-work res in the packing column?—A. Yes, sir.

Have you some original books or entries that show that?—A. ing, only sheets of paper on which I had been working up the unt of cement used.

Did you keep any books, or anything in the nature of books, or a for entries of your regular measurements and estimates of the unt of work done of various kinds?—A. No, sir; that is, I have estimate sheets that were made out for monthly estimates in com- son with the Government estimates; that would show only the tities.

When you say 9,808 yards was the real quantity of packing, do mean the real quantity that was actually put in, or do you mean quantity that should have occupied the space that was left outside he brick masonry and stone masonry?—A. Yes, sir; the amount of that I supposed was filled. Mr. Quackenbush said that he wanted mount of mortar used in the whole amount of work.

Yes; separating the brick cement and mortar from the packing

cement and mortar, which was of a different kind, as we understan was it not?—A. No, sir; that is, I don't so understand. They used t same cement for the brick-work that they did for the rubble-work, a the same sand. The material was just the same.

Q. Are you confident of that?—A. Yes, sir.

Q. It is proper to tell you that some witnesses have testified, and w presumed that it was true, that the mortar used for the rubble-ceme packing was made with cement and unscreened sand, which unscreene sand would contain pebbles and other large objects which could not used and mixed with the cement in the packing, and therefore wou be known by the workmen and by the mixer to be mortar that was be used and could be used only in respect to rubble packing.—A. Ye I understand that is so. I simply mean to state that we used the sa cement and the same sand. I presume it was screened for the bric work, and it would be obliged to be mixed thinner.

Q. Now, are you able to tell us the quantities of each of those t kinds of mortar that appeared from the books or memoranda, or oth wise, to have been used?—A. The total amount of cement used w 26,929 barrels.

Q. How do you get at that number?—A. From our bills in the offi that we have showing the amount of cement purchased.

Q. When you say the total amount of cement used you mean t total amount that you have bills for was used?—A. Yes, sir; that w the only way I had of getting the information.

Q. You do not personally know that all the cement mentioned those purchase bills actually came to the tunnel and went into the tu nel work?—A. No, sir.

Q. Did you have any account of the amount of sand used?—A. was 8,605 yards of sand.

Q. That is the total for both kinds of mortar, screened and u screened?—A. Yes, sir.

Q. How many tons would that be?—A. There is about a ton to t yard. Different authorities differ so much about that that it would hard to tell exactly.

Q. Would it not be more than a ton to the yard of good, sharp, quar sand?—A. I presume it would be a little more, yes; I think they ma it as high as 2,600 or 2,800 pounds to the yard, some authorities, a some as low as 2,200.

Q. How do you get at this amount of sand; in the same way as t cement?—A. Yes, sir.

Q. From the purchase bills?—A. Yes, sir. That would make t percentage of cement about 70, and that of sand about 30.

Q. How many barrels of cement does it take to make a cubic yard? A. A barrel of cement is about 3¾ cubic feet.

Q. Then it would take nearly three barrels of cement, allowing f the waste, etc., in getting it out of the barrels, and any caked amou to make a cubic yard of usable cement, would it not?—A. I shou hardly think as much as that.

Q. State what you think.—A. Three barrels of cement and 6 of sa would make 33¾ cubic feet. I don't think there would be scarcely a waste of cement; I don't see how there could be.

Q. Let me see if you understood my question. My question had relation to sand; my question had relation to your knowledge, fro your experience as a civil engineer, as to how many barrels of cemen containing the number of cubic feet that you have already named,

ould require to make a cubic yard of usable cement fit to mix, as the ractice and accidents of the world go. Some barrels would be likely be spoiled; there would be some of the cement coming out of the arrel that would be wasted on the ground, and there would be all the ccidents that in large operations, consuming many thousand barrels, ight happen. Now take that into view, we want your opinion as to the umber of barrels that would produce a cubic yard in bulk of the same ement as was going into the mortar for use. If you do not want to al- w anything for this purpose, it is a very easy computation, with 3¼ eet to the barrel, to ascertain what number of barrels and fractions it ould take to make a cubic yard.—A. I should think it might lose 2 or per cent.; that is, to put it in barrels.

Q. You say 3¼ cubic feet to a barrel?—A. Three and three-fourths.

Q. You think 3¾, taking it running through a thousand or more, ould produce a cubic yard of usable cement?—A. Yes, sir.

Q. In the course of your connection with the operations of the tunnel id you know or hear of any of the Government inspectors or subin- pectors doing any service in the way of overtime or of keeping time r the contractors?—A. I don't know that I have heard anything of it ntil since the investigation began; I have no recollection of ever hear- g it.

Q. In the course of your operations there, as the engineer of the con- actors, did you know of the men working more than nine hours in a ay or nine hours in a night shift?—A. I think I did, yes; I don't know hat I ever knew of their working more than nine hours in a night hift.

Q. But in a day shift you did?—A. I knew it was understood—I ever knew from personal knowledge at all—that the men were work- g sometimes overtime; our men were, and I understood the inspectors ere also.

Q. Did you, or not, know or hear that the Government engineers in harge had given directions that the men should not be allowed to work ore than nine hours?—A. Well, I don't know. I have an indistinct ecollection that I heard something about it once; that is, I should say ore than a year ago, in some way; I don't remember anything about he circumstance, but I think that I did hear something said about it t the time, a year or so ago.

Q. Did you ever make any report of it to Beckwith & Quacken- ush?—A. No, sir; I don't think I ever did. As I say, I don't think I ver knew anything of it; I would not be positive of it, but I think I eard something about their working overtime, and that there was ome report made of it.

Q. Did you have any occasion, in the course of your duties, to know he length of time the men should work or have any control over it?— . No, sir; nothing of that kind at all.

Q. I think you stated, when you were on the stand before, that your ission was merely to keep the alignment and measure up the cross- ections as a check upon the Government engineer's measurements?— . Yes, sir; that was my whole business, with the exception of meas- ring sand, or something of that kind occasionally, but I had nothing do with the work in the tunnel.

Q. Did you measure these cross-sections by what is called the rectan- ular system?—A. No, sir.

Q. What system did you use?—A. I stated in my testimony before hat I used radial lines, drawn from the center.

Q. Did you ever know or hear, in the time of it and down until th time when these matters became public, of any names on the time-book that were not names of real persons?—A. No, sir; I never did. I wi say that I don't think I ever looked at a time-book from the time I wer in the office until the work was closed.

Q. My question was not confined to your seeing the time-book; m question was whether you ever heard of such a thing?—A. No, sir; never did.

Q. Or envelopes being prepared, and money put into them and a dressed to assumed names, but intended for some of the inspectors, an given to them?—A. No, sir.

Q. You never heard any rumor or hint of that sort?—A. No, sir; n once.

The CHAIRMAN. That is all.

The WITNESS. One other thing. Mr. Quackenbush in his testimon swore as to the amount of mortar used under the last contract as 23 pe cent. I made my calculation—he gave that estimate as being my ca culation—that 2 barrels of sand and 1 of cement would make 9 feet mortar. I have since learned that the Government, by actual test makes 11 feet from 2 barrels of sand and 1 of cement.

Q. Do you know anything about it personally?—A. No, sir; I do no I didn't see it done. I simply wanted to correct that for Mr. Quacke bush, if it was necessary. It would make the percentage 28 instead of 2

Q. How can you correct that? His statement was made from you own personal opinion and calculation, was it not?—A. Yes, sir.

Q. Do you want to alter your own personal opinion and calculatio upon this mere hearsay that has come to your knowledge?—A. I base my opinion not upon my own tests of actual measurement.

Q. What did you base your own opinion upon?—A. Upon the a thorities of different engineering works.

Q. That have come to your knowledge in the course of your career an engineer?—A. Yes, sir.

Q. And all you know against that now is that you have heard tha the Government engineers made some experiments which showed larger total result from that amount of sand and cement?—A. Yes, si All I mean to say is that different sands would make a great differenc probably, in the proportion.

Q. A micaceous or limestone sand, or anything of that kind, wou make a good deal more bulk of mortar than a sharp, siliceous san would it not?—A. Yes, sir; some sands would have a good many mo voids than others.

Q. And your calculation was based upon the kind of sand that ough to be used in cement, was it not—a good, clean, sharp, siliceous sand?- A. Yes, sir; as I say, I took my figures from engineering works.

Q. Speaking of the kind of sand now under consideration, the be siliceous sand, have you any reason at this moment to change yo opinion, derived from your reading, education, and experience in th course of your profession?—A. I only know that if they have mad the actual tests which they say they have, those tests would show different result from what I have learned in the course of my busines

Q. Then you would want to know precisely what kind of sand the used in making those tests?—A. Yes, sir; and of course I couldn't swe to it from personal knowledge.

Q. Is there anything more you wish to say?—A. That is all.

TESTIMONY OF ALBERT HEITMULLER.

WEDNESDAY, *December* 12, 1888.

ALBERT HEITMULLER, sworn and examined.

By the CHAIRMAN:

Q. What is your age?—A. Twenty-nine years.
Q. What is your occupation?—A. Clerk.
Q. What kind of a clerk; in what business, I mean?—A. I have en following different; I was time-keeper, and book-keeper, and clerk a railroad.
Q. What railroad?—A. New York Central.
Q. Did you come to Washington from that employment?—A. Yes, sir.
Q. When did you come to Washington?—A. In December, 1883.
Q. Whom did you go to work for?—A. I had an arrangement before ame here to go to work for Beckwith & Quackenbush.
Q. What did they employ you to do?—A. At first they didn't have place open of importance, but in a little while I got to working for em, and worked until about February. After that I was time-keeper.
Q. Time-keeper on the tunnel work?—A. Yes, sir; on the tunnel.
Q. February of what year was that?—A. 1884.
Q. That is about the time when the work on the tunnel began, was it t?—A. Yes, sir.
Q. Did you keep these three time-books that I now show you, and at are numbered in print 1, 2, and 3? Look at them and see.—A. , sir.
Q. Did you ever see them before?—A. Yes, sir.
Q. In Beckwith & Quackenbush's office?—A. Yes, sir.
Q. Do you know in whose handwriting these books are?—A. Yes, sir.
Q. Whose?—A. Mr. Leroy's handwriting.
Q. Who was Mr. Leroy?—A. Leroy was superior to me. He was a rk there.
Q. Did Leroy make up these books from your little time-book?—A. did; yes, sir.
Q. You kept small time-books, I suppose?—A. Yes, sir.
Q. Do you know where those little ones are that you kept?—A. I n't know.
Q. Did you keep them regularly?—A. I did.
Q. How did you get the information upon which you made them ? Were you on the spot?—A. Yes, sir.
Q. You were on the spot to see who the men were that were work- g, and when they came on and when they went off?—A. I had to get good deal of my information from the foreman and the superintend- t. It was my duty to start when the men would go to work in the rning at 7 o'clock; I had to make the trip of the whole line, which s nearly four miles long, and I had to make it twice a day, in the enoon and the afternoon; so I wasn't able to watch the men, and had ry little time to spend at each place.
Q. How did you get the names of the men?—A. By asking the men.
Q. Did you ever put down on your little time-book the names of any the men who were not actually there at work?—A. No, sir; I did t.
Q. Did you ever put down any assumed or fictitious names?—A. I l, by order.
Q. By whose order?—A. Mr. Palmer's.

Q. Mr. Palmer did not come in until two or three years after y
began, did he?—A. He didn't come in until the last time we started
work.

Q. Before Mr. Palmer c me in did you put down any false or assum
names?—A. I did not.

Q. Do you know whether Mr. Leroy did when he made up the book
A. I don't know.

Q. Before you started this last work were you ever asked or told
anybody to put down any false names?—A. I was not.

Q. So that, so far as your knowledge goes, down to this last contra
in which Mr. Palmer was interested, the time that you kept was
honest and true, was it?—A. Yes, sir; to my knowledge.

Q. And you put down no false or assumed or pretended names?—
I did, by order.

Q. But I mean before Mr. Palmer came?—A. No, sir.

Q. You did not?—A. No, sir.

Q. What were you told by Mr. Palmer to do when you say you
this by order? What did he say to you?—A. Mr. Palmer told me t
there was some overtime, and we had to manage it in some way a
pay for it, and he said he had been speaking and thinking about it
the beginning of the week. I don't know exactly how it was. And
he said, "We have to do something about it." And after that I o
spoke very little with him. We didn't speak no more until the end
the week about it.

Q. What took place about it at the end of the week?—A. He told
we would have to make some allowance for overtime, as he could
expect the men to stay and work and not get no pay for it, and he s
he had been speaking and thinking about it; he said it would have
be allowed in some way.

Q. What did he tell you to do, if anything?—A. He told me he wo
have to allow 50 cents an hour for overtime, and he said, "You can
it in some way." He said, "It isn't necessary for the men"—he sa
"Put it in in some way as overtime, or do as you please, or any nam

Q. He left you to select the false names, did he?—A. He did not.
course, I say, I didn't know certain names, and when he told me "
name," I said "Well, call it John Smith." I don't know if he m
such a remark; it has been quite awhile ago; I couldn't say whet
he agreed to it or if it was any name that I suggested.

Q. How many assumed or pretended names did you put down?—
A few.

Q. How many do you think?—A. Three or four.

Q. Tell us what they were?—A. One was John Smith.

Q. Whom was John Smith intended to represent?—A. I don't kn

Q. What other false name was there?—A. John Night.

Q. Do you know whom he was intended to represent?—A. Yes,

Q. Whom?—A. O'Brien.

Q. That is Inspector O'Brien?—A. Yes, sir.

Q. What was the next pretended name?—A. John Luke.

Q. Whom was that meant for?—A. Lucas.

Q. He was the inspector?—A. He was the inspector; yes, sir.

Q. What was the other false name?—A. John Wood.

Q. Whom was that for?—A. Woodward.

Q. Was he an inspector?—A. Yes, sir.

Q. Was he an inspector?—A. Yes, sir; to my knowledge.

Q. Did you yourself invent those false names?—A. I did not.

Q. Tell us who did that?—A. The first name was put in, and af

hat Mr. Palmer said that he had to do it some way, and he had to fix . So I don't think it was my invention in shortening the men's names.

Q. You say you did not select these particular false names?—A. I on't know that I could tell that I had any order for those certain ames. It is partly my own, I should judge.

Q. What part of it was partly your own and what part of it is partly me other person's?—A. I don't understand.

Q. You say it is partly your own. Who else, besides yourself, did nything towards selecting these four names?—A. Mr. Palmer was the an that gave me the order.

Q. Did he give you the names?- A. He did not; he said he didn't re under which name.

Q. Did he mention the name of Lucas to you as being one of the ersons that he wanted a false name put down for?—A. He told me ucas was entitled for overtime for a few hours.

Q. Did he mention the other three inspectors that you have put in lse names for?—A. He mentioned it when he gave me the time.

Q. Had you been a time-keeper before anywhere?—A. Yes, sir.

Q. Had you ever put down any false names before?—A. No, sir.

Q. Had you ever been asked to?—A. No, sir.

Q. Did you not know that that was wrong?—A. No, sir. It was rders, and I was employed by these men, and so I had to do accordg to orders.

Q. What was the objection to your putting down the actual names f these persons who were working overtime and ought to be paid?—. My intention was, or my idea is, or probably the reason of it is, that case the envelopes should be found by any of the laborers.

Q. Why did you want that the laborers should not know?—A. Beause it was not the laborers' business. The inspectors were there to atch them in the overtime. The laborers should only know that the spectors were there such a length of time, and that they were there atching the men to see that the work was done.

Q. Did not the laborers know that that was what the inspectors were here for?—A. I don't know. The laborers, of course, would know that e inspector would watch them. But the way I understood before was hat the inspectors was to work for the Government, and was only to ay until 5 o'clock, and it was their duty to stay until 5 o'clock, and fter 5 o'clock they were not going to get any pay.

Q. And so it was thought necessary that false names should be inented for that, was it?—A. I don't know that it was thought necessary.

Q. At any rate, you were ordered to do it, for whatever motive?—A. was ordered to do it.

Q. Where did you get the time for those four false names?—A. From Ir. Palmer.

Q. You did not know it from your own observation or asking any of hese subinspectors?—A. I wasn't there at that time. I left the tunnel bout 5 or half-past 5, and I don't know what was going on afterwards. o I just had to get it the best way I could.

Q. You got it from Mr. Palmer?—A. I did.

Q. And you put down against these false names whatever time he ld you to?—A. Yes, sir.

Q. Did Mr. Quackenbush know anything about it?—A. I don't think e did.

Q. Mr. Beckwith?—A. No, sir.

Q. You were employed by Beckwit.. & Quackenbush, were you not?—. Yes, sir.

Q. You were not employed by Mr. Palmer?—A. I was.

Q. What were you employed by him to do?—A. To keep his check-ro every week.

Q. Anything else?—A. No, sir.

Q. This time that you were taking and reporting was, then, take entirely for Beckwith & Quackenbush, was it not?—A. Yes, sir.

Q. Why did you not tell them that their subcontractor was tellin you to put down on the time-book, and that you were putting dow false names to represent payments to these inspectors?—A. They ha a time-book of their own, and Mr. Quackenbush never looked at it, e cept the amount. They had an entirely independent set of books fo themselves.

Q. Where did they get the time to put into them? They got it fro your books, did they not?—A. From me.

Q. These are their time-books which I have shown you?—A. Yes, si

Q. And you say these are made up from yours?—A. Yes, sir.

Q. When you brought in these little time-books, to make up thes general time-books from, for Beckwith & Quackenbush, there were o them some of the false names?—A. Yes, sir.

Q. And some time carried out from your report showed that Joh Night, John Luke, John Smith, and John Wood appeared to have do work?—A. Yes, sir.

Q. When there was no Wood, Night, Lucas, and Smith, and you di not tell Mr. Quackenbush anything about it?—A. I did not, because had orders, and then I knew they had their own books.

Q. They made up their own books from yours, you said?—A. No.

Q. Have you not said so? They made up their time-book right fro yours?—A. That is our make-up.

Q. Did you tell Mr. Leroy?—A. I did not; I told him it was ove time.

Q. Overtime of whom?—A. On the brick-work.

Q. But overtime by what persons?—A. No, I didn't.

Q. And so Mr. Leroy did not know, according to your statement, an thing about these false names?—A. No, he did not.

Q. Did you not know that this time was taken, kept, and reported f the purpose of having Beckwith & Quackenbush pay money on it?—A Yes, sir.

Q. And yet you did not tell them that you were making false r turns?—A. No, sir.

Q. And you are confident that Leroy knew nothing about it?—A. am.

Q. Did you ever have any conversation with Leroy on the subject?- A. No, sir.

Q. Have you since?—A. Yes, sir.

Q. When?—A. Lately.

Q. How lately?—A. Two weeks ago.

Q. Any since two weeks ago?—A. Yes, sir.

Q. When?—A. On different days; I couldn't remember.

Q. When was the last day you had any talk with him on the su ject?—A. It was on Friday.

Q. Was that after you were summoned to appear here as a witness?- A. No; it was before.

Q. What took place between you and Leroy on Friday?—A. Mr. L roy told me he wanted some explanation about it, because he didn know anything about it, and he inquired how it was, and so and so.

Q. That was last Friday?—A. Yes, sir.

Q. What conversation had you had with him before?—A. The books me down here, and he told me the books were down here, and if there as anything wrong about them he wanted to know. I didn't say there asn't anything wrong about them, except these items.
Q. That is what you told him?—A. Yes, sir.
Q. Who began the first conversation you had with Leroy on this sub-ct, which you say was two weeks ago or more?—A. I don't know.
Q. You do not know which of you began it?—A. No, sir.
Q. Where did you see him?—A. In the office.
Q. Are you employed there now?—A. Yes, sir.
Q. And you don't know which of you spoke about it first?—A. I do t.
Q. You can not remember?—A. No, sir.
Q. Now repeat to us, just as carefully as you can, the first conversation ou had with Leroy upon this subject, what he said to you and what ou said to him.—A. The first conversation Mr. Leroy told me, he said e had orders to send books to this department, and he asked me if ere was anything wrong about them. I told him no, I didn't know, xcept some overtime, and also names. He said, "Is that so?" He id that is the first he knew of it. Then we were speaking, and I said didn't think anything wrong because he didn't know it. He said, "I asn't here at that time." He asked me when it started about giving is overtime. I told him when it began, and he said he wasn't here, nd said he knew nothing about it.
Q. You said what?—A. When we started to work the last time, very on, a couple of weeks after.
Q. And what did Leroy say?—A. He said that he wasn't here, so he dn't know anything about how it came to be put in.
Q. Where was Leroy then?—A. In the office.
Q. No; I do not mean when the conversation occurred with you, but hen you first began this false time-keeping?—A. He was in New ork.
Q. When did he first come here to begin work?—A. He was all the ne here, but he was working during that time on the Erie Canal.
Q. He was away temporarily?—A. Yes, sir.
Q. Do you know how soon he came back after you began this kind of me-keeping that you have described?—A. He came back in June, I elieve—the latter end of June.
Q. Why did you not tell Leroy, who had charge of the time, appar-ntly, what you were doing when he did come back?—A. Because, enator, them men gave me orders, and I thought there was nothing rong; these men knew better than I.
Q. Did Beckwith & Quackenbush authorize you to take orders from almer?—A. In this time business they have.
Q. What did they tell you to do?—A. If there was any overtime or I told them now and before that any overtime I couldn't get myself, ecause I can't be every place and watch the men and see what time ey would leave, and so I had to take the men's word for it.
Q. Did they tell you at any time to take orders from Palmer?—A. I ppose the tunnel includes the whole, the tunnel and brick-work.
Q. That is not the question. My question is whether Beckwith or uackenbush ever told you to take any orders from Palmer about the ay you should keep time?—A. No, not specially.
Q. When Leroy came back he had special charge of the time, and you d not tell him anything about it?—A. I did not.
Q. Nor never afterwards until a week or two ago?—A. Yes, sir.

Q. Have you had any conversation with Palmer upon this subject?—A. No, I didn't.

Q. Have you seen Mr. Palmer within three weeks?—A. Yes, sir.

Q. Where?—A. In our office.

Q. How many times?—A. Three times.

Q. Fix those times, as nearly as you can, when you saw him?—A. couldn't fix near enough; I seen him twice in the morning and once i the evening.

Q. Each time at the office?—A. At our office; yes, sir.

Q. Did you see him anywhere else?—A. I did not.

Q. Now, tell us what conversation, if any, took place between yo and Palmer the first time.—A. Nothing in connection with any tunne

Q. I did not ask you to tell what it was not; I asked you to tell wha it was.—A. All the conversation I spoke to him was about a horse an wagon that he wanted to sell.

Q. Now, take the second time you mentioned; what took place b tween you and Palmer the second time?—A. The second time was th same conversation; and besides he asked me what I am doing now, an then I asked him about a certain job he was speaking of.

Q. What about that job?—A. At Canoga, about a dam.

Q. Was there anything else in that second conversation?—A. No that I remember.

Q. So that in those two conversations, had within two weeks of eac other, there was nothing said about this business; the first was abou a horse and wagon; the second was about a horse and wagon; and th second was about a dam at Canoga?—A. Yes, sir.

Q. Tell us what the third meeting was?—A. At the third meeting M Palmer came in the office and he said, "Well, where is Mr. Quack enbush?" I said, "Mr. Quackenbush has gone to Baltimore, I believe He said that Mr. Quackenbush wanted to see him to-day. It was abou half past 9 in the morning when he came in, and he took a new paper and sat by the stove, and I said, "Mr. Palmer, I have got to g out," and I left him out and closed the office.

Q. Was that the whole of the conversation?—A. That was the who of the conversation. He sat down and I had some writing to do, so didn't have any more conversation with him.

Q. And did you not have any talk with Mr. Palmer at all about th time business?—A. I did not.

Q. Did he say anything to you about it?—A. He did not.

Q. Nor you to him?—A. No, sir.

Q. Have you seen him since that third time?—A. I have not.

Q. Did you see any bad work going on in the tunnel?—A. No, sir.

Q. It was all going on well when you saw it?—A. Mr. Quackenbus was blaming us that we didn't see or say anything; but the way it wa with me was I hadn't but very little chance; I had to make these fou mile trips, and it took all my time to go through, climbing over every thing, up and down, to get reports from the foremen of overtime and report of what was done the day before; so it filled my time so I didn have more time than to stay ten or fifteen minutes at each place whe each gang of men was at a time.

Q. When was it that Mr. Palmer complained as you have spoken?

The WITNESS. Complained of what?

The CHAIRMAN. You said, "Mr. Quackenbush complained of us tha we didn't see what was going on," or words of that kind.

A. He has been complaining ever since this investigation started he claims that we didn't do our duty and were not more careful.

Q. Had he ever said anything about it before?—A. Not since the vestigation started; he has worried.

Q. Did he ever say anything about that before the investigation arted?—A. Senator, he could not.

Q. I was not asking what he could or could not do; I was asking hat he did do.—A. No, sir.

Q. Did you ever have any conversation with Mr. Beckwick about it?—. Mr. Beckwith was not here at that time.

Q. He has been here some time since you have been time-keeper, has e not?—A. Yes, sir.

Q. Did you ever have any conversation with him about it?—A. No, r.

The CHAIRMAN. I wish you would bring up here day after to-morrow t 10 o'clock in the morning all those time-books that you kept, every ne of them.

The WITNESS. Yes, sir.

TESTIMONY OF ARTHUR W. LEROY—Recalled.

WEDNESDAY, *December* 12, 1888.

ARTHUR W. LEROY, recalled and further examined.

By the CHAIRMAN:

Q. Have you the papers and information that we asked you to look p?—A. No, sir; I have not. When I was here with Mr. Quackenbush, think it was then that you requested the amount of money paid to Brennan & Palmer, and also Brennan & Emery, as subcontractors, and hat I brought you yesterday morning. That is all that I recollect of.

Q. That is it. I believe that you stated on a former occasion that hese three books, marked in print 1, 2, and 3, and which were particularly described before, were the time-books of Beckwith & Quackenbush on this tunnel work, did you not?—A. The time-books of Brennan & Palmer and Brennan & Emery.

Q. Did you not tell us that these were the time-books that belonged to Beckwith & Quackenbush?—A. Yes, sir; belonged to them, and in our office, and they are especially for the masonry lining.

Q. Tell us whose handwriting they are kept in.—A. They are in the handwriting of different persons, three or four different ones, to my knowledge. From the beginning up to page marked "Howard University, week ending Friday, February 5, 1886," is my handwriting.

Q. Then the following pages are in whose handwriting?—A. In the handwriting of Mr. Davis, the book-keeper, up to and including the heading "Howard University, Friday, November 26, 1886."

Q. On the last page mentioned, in whose handwriting are the penciled words at the bottom, "John Smith," and carried out $8?—A. Mr. Davis's.

Q. Davis was the book-keeper?—A. Yes, sir.

Q. Take Howard University, Friday, January 29, 1886; in whose handwriting are the words "John Smith," at the foot of the line, and carried out $8?—A. My handwriting.

Q. Then follow two pages in your handwriting?—A. Yes, sir. Then the next two pages are in the handwriting of Davis. Then on the page marked "December 10, 1886, Champlain avenue," a part is in my handwriting, the last two names, David Montague and John Smith. The next page, marked "Howard University, December 10, 1886," is in

Mr. Leroy's handwriting, except the last name entered, "John Smith," in pencil, and that I should say Mr. Davis wrote, though I am not positive; it is similar to that other writing of Mr. Davis.

Q. You are familiar with his handwriting?—A. Yes, sir.

Q. And the rest of the book is partly in your handwriting and partly in that of Mr. Davis?—A. Mr. Heitmuller's writing appears at Champlain avenue, W., Friday, January 14, 1887, and so on.

Q. All of that handwriting would be his, wherever we find it?—A. Yes, sir.

Q. Now take book No. 3; book No. 2 we can pass without any difficulty, because the handwriting is fixed. The first two pages are in whose handwriting?—A. Mr. Heitmuller's.

Q. Are you positive?—A. Yes, sir. The page marked "Friday, March 4, 1887, west connecting shaft," is Mr. Davis's handwriting; that is where his handwriting begins. All the preceding pages are in Heitmuller's handwriting. From Rock Creek east, March 4, it is Davis's handwriting down to the last two names, which are in my own handwriting. On the next page it is Davis's handwriting down to Peter Kennedy, and the rest is in my handwriting. On the page marked "August 12, 1887, Howard University," that is all Heitmuller's handwriting except the last name, John Smith, in pencil, and $8 carried out, which is in the handwriting of Mr. Leroy.

Q. Who was John Smith, whose name you appear to have entered more than once in your own handwriting?—A. I couldn't tell who he was; but he was a laborer or packer.

Q. Did you know any such man at the time?—A. I think that we had several men by the name of Smith, but what their given name was I couldn't tell you. I know we have had George Smith and Frank Smith, and possibly John Smith.

Q. Did you ever know the man John Smith, whose name you wrote yourself in these books?—A. No; I can't say that I did; there is very few men in the tunnel that I do know.

Q. I did not ask you whom you did not know; but I ask you whether you know John Smith, whose name you wrote with your own hand in those books.—A. I can't say that I did; no, sir.

Q. Who did you think he was at the time you wrote that name?—A. I don't know, but I thought he was a laborer.

Q. How came you to put it down at the end in your own handwriting?—A. I was instructed to do it by the subcontractors; I don't know of anybody else that would instruct me to do it. I know that I have been told by Mr. Emery.

Q. What did Emery tell you?—A. He would tell me to give John Smith so many days or such an amount of money; that I was to enter it on the check-roll so many days or such an amount.

Q. Did you understand from what Emery told you that John Smith was a common laborer?—A. Either a common laborer or a packer; sometimes they are designated either way.

Q. Did you ever think to inquire how it happened that John Smith's name should have been so systematically omitted from the regular previous entries on the pay-roll?—A. No, sir.

Q. And always had to be supplied by you or somebody else?—A. I never made inquiry.

Q. Did you have any curiosity about it?—A. I might have had some curiosity.

Q. If you had any, tell us what that curiosity was.—A. I don't know that I ever did have any; I never inquired as to who he was.

Did Emery tell you this from any book or memorandum that he present at the time?—A. I think he did; yes, sir.

Did he keep a memorandum book?—A. Yes, sir; Mr. Emery used eep a time-book of his own.

These are the original books, are they, in a general sense; they taken from Heitmuller's time, are they not?—A. Yes, sir; they taken from the small time-books.

And that small time-book was kept by Heitmuller?—A. Part of ime. We have had several time-keepers on the work.

During all the time that Heitmuller was there they were kept by ?—A. Yes, sir.

Wherever I have pointed out to you the name of John Smith—there are probably a good many other places where John Smith ars entered by you or Davis or somebody—it does not appear to been copied from the time-book kept by Heitmuller.—A. Whether is so I don't know; I don't know whether it was copied or not. It tered in my handwriting in different places, and by Mr. Davis in rent places.

At the end, in pencil?—A. Yes, sir.

Did you not believe, when this name of John Smith appeared to in this curious and odd way from time to time, that there was no real person?—A. No, sir; I did not. I didn't know whether there or not.

I was not asking about your knowledge; I was asking about your f.

e WITNESS. If I believed there was not?

e CHAIRMAN. Yes.

No, sir.

Did you believe there was?—A. I did.

You thought he was a laborer?—A. I couldn't say what he was g, whether he was a laborer or not, or if you call a packer a laborer, her he was a packer.

You did not know whether he was a laborer or packer?—A. No, I t.

Was Beckwith, or Quackenbush, or anybody else paying laborers packers 50 cents an hour?—A. No, sir.

They were not?—A. They were not.

Then when you saw that John Smith was frequently carried at 50 an hour, to the extent of $5 and $8, did it never enter your mind ink that that was rather a curious performance, to pay a laborer acker 50 cents an hour or more?—A. It might have entered my in that way, yes.

It would be rather natural that it should, would it not?—A. Yes, uld.

You are a business man, and you were looking out for the interests eckwith & Quackenbush, were you not?—A. Yes, sir; and for very reason it didn't annoy me. I didn't watch those time-books would happen in the tunnel for that reason.

You did not care how much was paid?—A. To Brennan and Emery, r; not as long as I knew that they were earning what was charged them; that their estimates covered the expenditures, the check-

Did you ever have any conversation with Mr. Emery upon the ct of John Smith?—A. No, sir.

Did you ever have any conversation with Mr. Emery upon the ct of John Wood?—A. No, sir.

Q. John Luke?—A. No, sir.
Q. John Night?—A. No, sir.
Q. Did you ever hear of any such persons?—A. I don't know Jo
Wood. I couldn't say that I did hear of any such persons. I sa
can't recollect the names.
Q. You knew who the inspectors were, did you not?—A. Yes, sir.
Q. That they were Lucas, O'Brien, McNamara, Woodward, and
on?—A. Yes, sir; I knew all those that you have mentioned.
Q. Did you ever hear anything about their working overtime, I me
in the time of it?—A. Yes, sir.
Q. Did you ever hear any conversation or discussion, or have a
concerning who was to pay them for the overtime?—A. No, sir;
don't think I ever did; I don't remember of having any discussion.
Q. What did you hear about their working overtime?—A. I hea
that they were working overtime; that they demanded 50 cents an h
for working overtime; I know that in one instance, because at that ti
I was requested to give one of the inspectors some money for worki
overtime, because it was said that he refused to stay after the nine ho
that he was paid for, and he was paid for the overtime at the rate of
cents an hour.
Q. Which inspector was that?—A. It was Mr. Thomas Lucas.
Q. Who told you of it?—A. I think Mr. Emery; I won't be posit
as to that, but I am quite sure that it was.
Q. What did you do about it?—A. I gave Mr. Lucas the money.
Q. Did you take a receipt for it?—A. No, sir.
Q. Did you put it on the time-book?—A. No, sir.
Q. To what account did you carry that expenditure?—A. I did
carry it to any account myself; I asked our book-keeper for the amou
and he gave it to me.
Q. Did you tell him what it was for?—A. I don't know that I d
and I don't know but I did; very likely I did tell him what it was f
Q. What would be his duty in that case as to making an entry abo
it?—A. That I can't tell you; I don't know what entry he did make
it on the books.
Q. What would be the proper disposition to make of it on the books
A. Charge it up to Mr. Lucas, inspector.
Q. Mr. Davis was the book-keeper, was he not?—A. Yes, sir.
Q. You said that you told him what the money was for?—A. I sa
think I did; I am not positive whether I did or not; that was three
four years ago.
Q. How would Davis know how to enter it up unless you told h
what the money was for?—A. He wouldn't know; and for that rea
I think I did, because Mr. Davis would very naturally want to kn
what it was for.
Q. Regularly that should appear in the books as so much being p
to Lucas for overtime, should it not?—A. If I was keeping the boo
myself I think I would enter it so.
Q. Are you not sufficiently familiar with doing business to kn
whether that would be the proper and honest thing to do?—A. Yes,
Q. If you know that much tell us what you think about it. Wh
was the proper and honest thing to do in the case?—A. I think it shou
have been entered up to Mr. Lucas, provided Mr. Davis knew that
went to him.
Q. Was Mr. Davis in the habit of giving you money to spend witho
knowing what it was for?—A. Yes, sir. I correct that. I usually us
to tell Mr. Davis what I wanted the money for; in fact, I don't kn

ut what I always did. I very seldom wanted any money, except my equisition for the check-roll, and he certainly knew what that was for, ecause I gave him a memorandum of the amount.

Q. And you had these time-books also to know what to make the equisition for?—A. Yes, sir; Mr. Davis had them.

Q. Do you remember anything about any such names as John Wood, ohn Night, and John Lucas; we have asked you about John Smith?—. No, sir; I don't. I remember the name of John Night appearing on he check-rolls, but the others I don't remember.

Q. How were those check-rolls actually paid when the accounts were ade at the office and the actual payment was to take place—how was done?—A. It was done in the tunnel.

Q. No; start at the office. What did you do at the office when you ad got the amount that each man was entitled to?—A. Put the money n envelopes and marked each man's name on the envelope, with the mount due to him, and that was carried to the tunnel.

Q. Who carried it to the tunnel?—A. I did.

Q. What did you do then?—A. Paid the men. I would start in the nnel, generally at Howard University, either one end or the other of he tunnel.

Q. And hand each man his envelope?—A. Yes, sir; as I met him.

Q. Then if you had any envelope addressed to either John Wood, ohn Night, John Luke, or John Smith, you gave it to him, did you?—. Providing they were called for; if not, Mr. Emery or Mr. Palmer, he subcontractors, would ask me for envelopes, and I would give hem to them—anything that was on the check-roll.

Q. But the men that were present you handed the envelopes to?—A. es, sir.

Q. But you could not identify these men?—A. No, sir; I couldn't dentify them.

Q. How could you identify those whom you did hand the money to?—. I left it entirely to the men's veracity in giving me their names. I ould ask each man his name.

Q. You would call them up together?—A. No, sir; I met them at heir different places of labor in the tunnel.

Q. And you inquired for each man that you had an envelope for?—. Yes, sir; as I would meet him; and when he gave his name I would ook for his envelope and find it and give it to him.

Q. But you did not make proclamation for anybody you did not eet?—A. No, sir.

Q. Suppose at the end of your trip through a particular portion of he work you had half a dozen envelopes left, and you had not met any ho answered those names; what then?—A. I would take that part ack to the office and wait there for them to call for them.

Q. Did either of these four Johns ever call at the office for any of hom?—A. No, sir; I don't think that they ever did; I am not positive bout that.

Q. What became of the envelopes with the names of these four Johns n?—A. I only recollect of two Johns having an envelope; one was ohn Smith and the other was John Night; I generally gave those to 'almer.

Q. When you did not give those to Palmer to whom did you give hem?—A. They would be brought back to the office, and if nobody alled for them they would be entered up on the next memorandum ook as unpaid envelopes.

Q. Have you that memorandum book now?—A. Yes, sir; it is at the office.

Q. Do you remember any instance in which an envelope addressed to either of these four Johns was not called for?—A. No, sir; I do not.

Q. I will ask you a direct question, and ask you to think a moment before you answer. Did you not know, in the course of this time before the work stopped and before any public disclosures were made, that money had been paid with considerable regularity, or with some regularity, or without regularity, in some way and at some times, to some of these inspectors, under false names?—A. No, sir; I did not.

Q. Did you believe any such thing?—A. No; I did not believe.

Q. Did you suspect any such thing?—A. No, sir; I can't say that I suspected any such thing.

Q. You did not even know, suspect, or believe?—A. No, sir.

Q. You can say, then, that in all these entries of what I will assume in this instance to be fictitious names on these books—some of which you say you have made yourself—that during all that period of time you did not even suspect that that was intended to cover a payment to somebody else?—A. Well, I can't say that I did, although I used to wonder at times after giving Mr. Palmer these envelopes and not knowing where they went; as I say, it did not annoy me at all, because I knew that they were earning enough to cover the envelopes and the entire check-roll.

Q. You did not care how much secret wrong-doing, if any, was going on between them and the Government officials?—A. Oh, no, I can't say that; I can't say that I didn't care.

Q. If you began to wonder whatever Emery, Brennan, or Palmer had to do with all these envelopes that you found nobody to deliver to, to what point was that wonder directed? You knew that there was nobody at work in the tunnel, or about it, except those men who were on the pay-rolls, even including Brennan, Emery, or Palmer, during their respective times, and the Government inspectors who were not on a pay-roll; that everybody who was in the tunnel or about it was on somebody's pay-roll, was he not?—A. Yes, sir; he was either on ours or on Mr. Brennan's.

Q. Or on the Government pay-roll somewhere?—A. Yes, sir.

Q. Delivering these envelopes from time to time for somebody, to some or all of these four Johns, to Emery, Brennan, or Palmer, you did wonder. Now to what point was that wonder directed?—A. I don't say that at all times I delivered those envelopes to them. I don't know but what I paid John Smith. As I say, I can't recollect the names; I may have paid John Smith, a laborer, in the tunnel, or I may have paid John Night. I made payments to between two hundred and three hundred men.

Q. You knew the inspectors personally, did you not?—A. Yes, sir I think I knew all the inspectors personally.

Q. Did you ever hand any of these envelopes, addressed to any one of these four Johns, to any one of the inspectors?—A. No, sir; not to my knowledge.

Q. Now think about that a little.—A. I have thought about it since this question was brought up, since I was here before, and since I learned that they had received overtime or money in envelopes under fictitious names.

Q. Suppose these inspectors should swear that you did deliver the envelopes to them; I want to know how certain you are; that is all;

t is why I put the question in that way.—A. I don't think they can so and swear correctly.

Q. You are positive that you never gave any one of these envelopes addressed to any one of the inspectors?—A. Yes, sir.

Q. You are positive about that?—A. Yes, sir; I am.

Q. Then what did you do with them? You must have given them to ne one of the subcontractors, then.—A. If he called for them, yes, ich I know of instances where he did call for them.

Q. Tell us some instance where he did call for them, and what was d.—A. Nothing, any more than my passing through the tunnel Mr. mer would ask me for certain envelopes and I would give them to him.

Q. What would he say when he asked you for the envelopes and you ve them to him? He didn't say that he wished you to give him cer- n envelopes, did he?—A. Yes, sir; he would say, "Have you an en- ope for" such a man, for such a name, and perhaps say, "He is not e now, but will be here this evening, when he comes on the night ft, and he requested that his envelope should be left with me, so that could get it."

Q. Do you think that that applies to any of these four Johns?—A. s; I do.

Q. Do you mean to say that Emery, or Brennan, or Palmer told you some time, in respect of some of these four names—which, for the rposes of this question, I will assume are false—that they were not sent at the time, but would be in the night shift, or the next morn- , or some time?—A. Yes, sir; I don't say positively that it was one he four Johns that you speak of, but may be Brennan would call for ozen names, and it might be one of those names; as I say, I don't ollect the names. But I would like to correct one thing I said. I nk you asked me if I ever gave an inspector an envelope, did you ?

The CHAIRMAN. I did.

The WITNESS. And I think I said no. Well, I have once or twice en an inspector an envelope, or at least I think I have, but I am not itive; and if he asked me for the envelope of a man that I knew was rking in the tunnel, telling me that that man had requested him to ve the envelope left with him, I would give him the envelope, know- that he would be there when the man entered. In a case of that d I might give him the envelope.

Q. Tell us a particular instance of that kind that you can remember.— I don't remember any particular instance.

Q. Can you remember any particular inspector?—A. No, sir.

Q. It is only a general recollection you have of something of that d having happened?—A. Yes, sir; I am not positive that it did hap- , only if they were to ask me I would have given the envelopes, and s possible that they did. I would give a laborer another man's en- ope, too.

Q. You said a moment or two ago that you would give an envelope an inspector under those circumstances if you knew the man was rking in the tunnel?—A. Yes, sir.

Q. Now, you have said, if I understand you, that you did not know t John Smith, or John Night, or John Luke, or John Wood was rking in the tunnel?—A. I don't know as they were, and I don't w but they were.

Q. Then you did not know that those four persons were working in tunnel?—A. No.

Q. And you have said that if you knew a man was working in tunnel you would give an inspector an envelope if he asked yo it?—A. Yes, sir.

Q. That does not apply to this case, because you did not know any one of those four persons with those four names was working i tunnel, you say?—A. I did not know as they were and I didn't but they were.

Q. Did you ever have any conversation with Mr. Palmer about false-name business that you are now speaking of?—A. No, sir.

Q. Did you ever have any conversation with him on the subje inspectors being paid for overtime, or time-keeping, or on any account?—A. No, I don't think I ever did; I don't recollect ever ha had any conversation with him.

Q. If you had had any conversation with him upon any subject w you have been likely to remember it or forget it?—A. I think very ly I would remember it.

Q. I think you have stated on your former examination that knew that the payment of the Government officials by anybody els the Government was an irregular and improper thing, did you no A. I don't know whether I was asked that question or not.

Q. I will ask it of you now, to make sure.—A. No, sir; I didn't t it was.

Q. You thought that was a regular and correct way of doing ness?—A. I didn't know that it was irregular.

Q. You thought there was nothing improper in it?—A. No.

Q. Did you think there was anything to be concealed about it? No, sir.

Q. Then if you knew that any one of these four false names wa tended to represent some one of the inspectors you knew that a had been resorted to which was entirely unnecessary, did you no you thought it was all right?—A. Yes, sir; had I known it I should

Q. Supposing the transaction were all honest and straight, and employment of Government officials by private parties to the busi was all right, as you think it was, what could have been the moti the subcontractors, or of yourself, if you did it, or anybody else, t to cover it up in the way I have indicated?—A. I don't know of motive; I don't know what could have been the motive.

Q. Do people generally keep books and make entries in them del ately without any motive?—A. No, sir; I think not.

Q. Do they generally write false names on envelopes intended particular officials without any motive?—A. No, sir; I didn't that those were false names.

Q. I am not on the question now whether you knew that those false names or not; I am on the question of your knowledge of the of this world. Did you ever have any conversation with Mr. Bre upon the subject of any of the inspectors working overtime, or kee time, or doing anything else for which they either expected, dema or ought to have been paid?—A. No, sir; I don't think I ever did

Q. Did you ever have any conversation with Mr. Emery upon the ject?—A. I think I did; yes, sir.

Q. When was that?—A. I can't give you the date, but it was time when Mr. Lucas received this pay for overtime.

Q. Will you not repeat the whole of that conversation? I think have alluded to it before. State everything that Emery said, and ev thing that you said.—A. Well, sir, I can't do that with any accu because it was so long ago; but I will, to the best of my recollec

Emery came to me and said that Mr. Lucas refused to work over
e hours, and it was necessary for the advancement of the work to
some packing at that particular time, and that no packing was
wed to be put in without there was an inspector there, and Mr.
as wanted to be paid at the rate of 50 cents an hour for overtime,
that he did stay overtime, and Mr. Emery came to me and told
to give that money to Mr. Lucas and charge it—by the way, I think
aid to charge it to their account, to the account of Brennan &
ry.

. Is that the only instance?—A. Yes, sir.

. Will you not fix the time, as nearly as you can, and what shaft it
ted to?—A. I am not positive as to whether it was Champlain ave-
or Howard University, but it was one of the two, I know.

. Do you remember what time of the year it was?—A. No, sir; I
ot.

. But it was while Emery was still in the contract?—A. Yes, sir;
vas still in the contract.

. How was it done?—A. That was Mr. Davis's work. I told Mr.
is, as I said before, who it was for; Mr. Davis was to take care of
he books.

. (Showing entry in time-book under head of "Howard University,
ober 29, 1886.") Is that entry of "John Smith" in your handwrit-
?—A. No, sir.

. Whose handwriting is it?—A. It is Mr. Davis's handwriting.

. Read the whole entry.—A. (Reading:) "John Smith, special
man."

. Have you reason to suppose that that is the same name, John
th, that you entered from time to time?—A. No, sir; I don't know
ther it is or not; I have no knowledge of any entry there.

. What is your belief about it?—A. I should think it was.

. Did you know any John Smith that was a special foreman?—A.
sir.

. Did you ever hear of one?—A. Not in the tunnel; not while I was
. At that time I was out of town. He might have been in with-
my knowledge.

. I see Howard University, January 28, 1887, there is an entry at
foot in pencil; read it, please.—A. (Reading:) "John Smith, packer."

. Do you believe that is the same John Smith that appeared on the
ner occasion as special foreman?—A. I don't know whether it is or
?

. What is your belief?—A. I have no belief in the matter at all; I
't know.

. You do not know, and have no belief?—A. No; no opinion in
rence to that.

. But I was not asking for your opinion; I was asking for your be-
—A. Well, I have no belief in the matter. I really don't know
to answer such questions, except by saying that I don't know
ther it was or not.

. And you say you have no belief on the subject?—A. It may have
, or may not have been, but I don't know.

. Howard University, Friday, February 18, 1887 (in time-book No.
Read the last entry on that page, please?—A. (Reading.) "John
th, laborer, three weeks to date, $24."

. Whose writing is that?—A. That is the handwriting of Mr. Davis.

. Did you know who that John Smith was?—A. No.

Q. What is your belief as to his being the same John Smith who a
pears without any occupation some of the time, and as special forem
at other times, and as packer at other times?—A. Well, I have to a
swer that just as I answered the others, that I have no belief in t
matter, although my opinion would be that it was.

Q. Your suspicion would be excited, would it not, in some way if y
found some place where John Smith, common laborer, was entered
earning 50 cents an hour?—A. Yes, sir.

Q. What was the price paid for laborers?—A. It varied from $1.25
$2.50; that is, if you call packers laborers; sometimes packers we
called laborers, and sometimes they were designated as packers; oth
wise it would be from $1.25 to $1.75; a common laborer, outside
packers, I think, never got more than $1.75.

Q. What did the packers generally get?—A. It varied from $1.50
$2.50.

Q. How did that variation arise?—A. From the ability of the pack

Q. Did you ever pay a packer $2.50 a day unless he was a mason
had some skill in the use of mortar and stone?—A. No, sir; probal
he was a better general workman, and able to do a better class of wo
and more work. I think there were very few instances where $2
was paid; I only call to mind one.

Q. To end what I wish to inquire about, and to see if we understa
you distinctly, I understand you to mean that with the one excepti
of Lucas demanding pay for overtime for one particular occasion wh
you got the money for the purpose of paying him, you had, down
the time that this matter became public, in October, no knowledge,
formation, or belief that the Government inspectors were receiving a
money or compensation in respect of their connection with that wo
from Beckwith & Quackenbush, or from any of the subcontractors?
A. No, sir; I had no knowledge whatever.

Q. Now, mark what the question is. The question calls for kno
edge, for information, and for belief, taken separately; for knowled
is one thing, information is another, and belief is a third. The qu
tion embraces them all. I want to know exactly what you mean to s
in answer to that question.—A. Well, I certainly had no knowledge
it; I didn't believe that they were.

Q. How about information?—A. No, sir; I had no information.

Q. Then you had no knowledge, information, or belief of the kind
dicated in the question? Do you say that deliberately?—A. Yes, s
that is, up to what time?

Q. Up to the time when the Kendall affidavits were made public
A. I will change that, then; I had no knowledge nor belief that th
were, but in the case of O'Brien I had heard it talked that he was
ceiving pay as foreman, acting as foreman. He was an inspector, a
acting as foreman or time-keeper for Brennan & Palmer, but I do
know where I got that information; it was general; I think I heard
talked at the shaft at Champlain avenue.

Q. Do you remember whom you heard it talked by?—A. No, sir
was trying to think. I had no information that he was, you might s

Q. I was asking whom you heard it talked by?—A. I say I can't rec
lect.

Q. You can not recall?—A. No, sir.

Q. How did you think he was getting his pay, if he was so employ
as you were the man who superintended the making out of the pay
counts and the delivery of the cash?—A. I supposed that Brennan
Palmer were paying him themselves.

Q. You knew that his true name was not on the time-books?—A. es, sir; I knew it.

Q. Is that all the qualification you wish to make to your last an- ver?—A. Yes, sir.

Q. Have you learned anything on this subject since the Kendall af- davits?—A. Yes, sir; I have heard things; I haven't learned any. es, I have learned things, too; I have learned that the inspectors ere being paid overtime under fictitious names.

Q. How did you learn that?—A. Mr. Heitmuller, I think, told me at.

Q. How did he come to tell you that?—A. In general talk in the office.

Q. General talk?—A. Yes, sir; talking over tunnel matters, and that uestion was brought up as to how they were paid.

Q. Who brought up the question?—A. I think Mr. Quackenbush did.

Q. Who was present in the office at that time?—A. There was Mr. uackenbush and Mr. Heitmuller and myself, and I think one or two hers; I can't say positively who they were.

Q. Were they strangers to you?—A. No; they would be some of the nployés of the tunnel, I think; that is, I think the former employés; don't know but what Mr. Palmer was there.

Q. Try to recollect a little, and see if you can not bring your mind to conclusion on that subject, whether Palmer was there or not.—A. I n not; it was either Mr. Palmer or Mr. Clark.

Q. Either Palmer or Clark?—A. Yes, sir.

Q. By Clark, you mean your engineer?—A. Yes, sir.

Q. When was that conversation when this matter was brought up general talk?—A. I think it was Friday or Saturday of last week.

Q. You think Mr. Quackenbush began it?—A. Yes, sir; I think Mr. uackenbush did.

Q. Will you not repeat to us exactly what he said, as nearly as you can member?—A. Yes, sir; I think that Mr. Quackenbush asked him——

Q. Asked whom?—A. Asked Mr. Heitmuller if there was any names that kind on the books.

Q. What kind?—A. Fictitious names. And Mr. Heitmuller said ere was; and then Mr. Quackenbush asked Mr. Heitmuller by whose uthority he put them there. Mr. Quackenbush then asked me if I new of it. I told him I didn't; then he asked Mr. Heitmuller by whose uthority he put them there, and Mr. Heitmuller told him Mr. Palmer's.

Q. Is that all?—A. Yes, sir; well, that is all that I recollect.

Q. Mr. Quackenbush did not ask what were the fictitious names?— . No, I don't think that he did; I don't recollect his asking.

Q. Did he ask how many there were?—A. No, he did not; I have een thinking, and I don't think I heard the whole of the conversation ut. I think that Mr. Heitmuller and some of the rest of them were ft in the office when I was called out for something.

Q. Then you do not know whether or not there was any more conver- ation after you were called out?—A. Not when I was called out.

Q. Have you told all the conversation that took place while you were ere?—A. Yes, sir; I don't recollect any more.

Q. Did Heitmuller say anything except what you have stated, that ere were false names, and that Palmer told him to put them on?—A. o, sir.

Q. And you did not hear Quackenbush or anybody inquire which were he false names?—A. No, sir.

Q. Did you have the time-books that were kept by Heitmuller, the

original ones, at hand?—A. I don't know where those are; I think s of them are in the office.

Q. Right where this conversation took place?—A. Yes, sir; in office where this conversation took place. I think they are there; not positive as to that; I don't know where the time-books are; are probably there in the office.

Q. And that was last Friday or Saturday?—A. Yes, sir.

Q. Was that the earliest conversation you had or heard upon subject?—A. Yes, sir.

Q. Has there been any conversation that you have had or heard the subject since?—A. No, sir; not on that subject, as I know of, in a general way, in talking over tunnel matters in the office, and I hardly hear anything else talked of but tunnel; but I don't kno I would recollect it if that was mentioned again.

Q. You haven't taken any part in any conversation on that su since with anybody?—A. No, sir. I might casually have mention to Mr. Heitmuller, but I don't know just what was said if I did.

Q. You have not had any conversation with Mr. Quackenbush a it since?—A. Yes, sir; I think I have.

Q. Will you not tell us what that was?—A. I think Mr. Quac bush asked me if I knew it; I told him that I did not, and that I w here at that time. We were speaking of Palmer at that time, a told him that I wasn't here when work was resumed, that I was in York State, and that when I came back and went to paying the myself it was in June and these men were on.

Q. When was this last conversation, that you have mentioned where?—A. That was in the office.

Q. What date?—A. I think it was Saturday; I think it was lat the day of the same Saturday; or perhaps it was Sunday; I recollect which day it was, but to the best of my recollection it either the same day or Sunday.

Q. You had stated before, I believe, that in the first convers Quackenbush had asked you if you knew anything about it, and had said that you did not, and then you went out before the convers appeared to have terminated with Heitmuller, and Palmer, if he there, and Clark, if he was there?—A. Yes, sir.

Q. Now you think that on the same day later, or the next (Sun Quackenbush repeated the question to you if you knew anything a it?—A. Yes, sir; I don't think he asked it in that way, but asked I think, why I allowed the names to go on and not make inquiries we were talking over the subject and several questions were a and answered, and I know I told Mr. Quackenbush that I wasn't at that time, he had forgotten the fact that I was not here at the when the work commenced.

Q. You came back in June?—A. Yes, sir.

By Mr. FAULKNER:

Q. June of what year did you come back?—A. June of the pr year, 1888; that was this last resumption of work.

Q. You were here in 1887, were you not?—A. Part of the time; sir.

By the CHAIRMAN:

Q. When you came back in June you then took charge of the books and all the actual payment of the money to the force?—A. sir; I didn't take charge of the books any more than to at times Mr. Heitmuller make out extensions.

. You wrote them in, however, yourself? You have already stated shown in your own handwriting one particular name at least.
ne WITNESS. Since the work commenced this last time in May?
ne CHAIRMAN. I do not know that; it would not be fair to say that.
ne WITNESS. I am not positive as to that; I may have written them nce, but I don't know whether I have or not.
. Did you ever hear of a man by the name of John Stone, a work- ?—A. I don't know whether I have or not, sir.
. I see here on the book "Champlain avenue east and Rock Creek, ay, August 24, 1888," the name of John Stone, with a cross-mark, he is designated as a common laborer, the cross-mark being similar nat frequently checked against these other fictitious names; and n Stone appears to have been working at the rate of 50 cents per r; he worked four-tenths of a day and got $2, according to the .—A. Those cross-marks appeared through the book in case time omitted one week, this week for instance, and the cross-mark would ut there to designate that it was omitted this week and carried ard to the next week, as a reference mark in many cases.
. In order to satisfy yourself in regard to that explanation, will you ake these cases and look right along; take these that are open at this icular place to which I have been calling your attention, Champlain nue and Rock Creek, August 24, 1888, and on the left hand you will "Night, John, cross, common laborer, $4." On the next page is hn Stone, cross, two-tenths of a day" and "two-tenths of a day" n, and "four-tenths of a day," rate per day at the top, "50 cents an ." Were either of those cases omitted or carried forward, as you e said, showing that that cross-mark was a reference to it? If so, it.—A. No, sir; I think not. I understand you wish me to find a where that would be the case?
Yes, and then look at those names that I assume to be fictitious es, and see if that check-mark was omitted for that reason and car- forward to the next.—A. Here is a case by reference to the case of es Lewis, marked above the time there [pointing].
. I see "Howard University, Friday, August 3, 1888, James Lewis," under the head of letter S., which I suppose means Saturday—does -A. Yes, sir.
. The first is entered in ink, one and one-tenth days; and in the e column above the figures, in pencil, a cross-mark; what do you say means?—A. I think that he was entitled to that time on the Sat- ay previous, and it was omitted.
. You think he was entitled to that time at Howard University on Saturday previous?—A. Yes, sir.
. Do you not observe that that is entered under the head of Mon- ?—A. There is nothing under the head of Saturday, and I think for that reason it refers to that.
. Then for the Saturday of the previous week there is nothing at —A. Yes, sir; but the time-keeper omitted to take his time.
. What makes you think that?—A. Because Mr. Heitmuller has me that.
. Then on that principle he did not work on the Saturday of the k ending August 3?—A. No, I should think not; I should think was for the Saturday previous.
. And so it is twice entered in the books as of the same day? No, only once entered on the books.
. It is intended to fill up something that was not entered before?— Yes, sir.

Q. That is what Heitmuller tells you?—A. Yes, sir.

Q. Did he tell you the same thing about John Night?—A. No, sir.

Q. How did you happen to get that explanation from Heitmuller?—A. He mentioned it casually.

Q. When?—A. I couldn't tell you when it was; I recollect that he did speak of it at one time.

Q. How long ago do you think it was that he spoke of it?—A. I couldn't tell you; it might have been six months, and it might have been a year.

Q. But you have it distinctly in your recollection that he called your attention to it?—A. No, it is not distinctly in my recollection; but since you speak of the cross-mark I recollect of his speaking of that at one time.

Q. And that that was what it meant?—A. That that is what the particular mark meant; yes, sir.

Q. Do you mean that particular one against the name of James Lewis?—A. No, sir; against any name that might appear entered in the books here.

Q. Might appear over the time figures?—A. Yes, sir.

Q. These entries I speak of are not over the time figures; they are in connection with the name of the man himself.—A. Yes.

Q. Then Heitmuller's explanation, and your suggested explanation do not apply to the false names?—A. No, sir.

Q. Then you can drop that part of the subject.—A. I didn't know what cross you had reference to when you went over there, Senator.

By Mr. FAULKNER:

Q. What time were you here in 1887?—A. I think I was here in all the months except November and December; I had been away at intervals during the year, and I don't recollect the dates now.

Q. Will you state who that John G. Cleveland is under the week ending Friday, April 1, 1887, Howard University?—A. I don't know; it is not my handwriting.

Q. Do you know whose handwriting it is?—A. I think it is Mr. Davis.

Q. Whose handwriting is that under Friday, June 3, 1887, at Champlain avenue?—A. That is Mr. Heitmuller's.

Q. And whose handwriting is the name of John Smith at the end?—A. That is my writing.

Q. That is $25, is it not, paid to him at that time?—A. Yes, sir.

Q. No time is fixed for the work at that point, is there?—A. No, sir; there don't appear to be any time.

Q. June 10, 1887, Champlain avenue; whose handwriting is the name John Smith at the end?—A. That is mine.

Q. It is in pencil, is it not?—A. Yes, sir.

Q. And all the rest is in ink?—A. Yes, sir.

Q. From whom did you get the information to put down five days in pencil there at $5 a day?—A. Either from Mr. Brennan or Mr. Emery; I think Mr. Emery was subcontractor at that time, and they were the only ones who had authority to give me any orders with reference to that book. I couldn't state which of them it was now.

Q. Did you take that from any time-book?—A. Not unless it was Mr. Emery might have given it to me from his time-book.

Q. What would be his position in that gang of workmen, receiving $5 a day?—A. He would have to be a bricklayer or a stone-mason; I think there were no stone-masons employed at that time.

Q. Were all the masons paid $5.50 or $6?—A. No, sir; they are paid $5.

. Friday, June 17, 1887, Champlain avenue west; in whose hand-ting is the name of John Smith there?—A. That is mine.
. That is also a payment of $25 without mentioning any time, is it ?—A. Yes, sir.
. Now, as I understand you, you were here from February 17, 1887, n to November or December, 1887?—A. Yes, sir.
. And your occupation during that time was in part to receive those elopes containing money for the hands and to go through the tun- and hand it over to them where you could find them?—A. Yes, sir.
. You had also an opportunity during that time to examine the ks and pay-rolls in the office, had you not?—A. Yes, sir. Well, I ld examine these books.
. Did it not excite your surprise that there was a man by the name ohn Smith being paid constantly, almost every week, frequently as as $25 during that period of time, without fixing any number of s that he worked at all?—A. No, I can't say that it did.
. Is there any other instance on these pay-rolls during that year n that occurred, except in regard to the name of John Smith?—A. , sir.
. Whose?—A. The one right there in the book (pointing); there is me entered there; I didn't notice the name.
. Cleveland?—A. No; it was another name, under the name of n Smith, where he was paid $30.
. No; that was one of the contractors.—A. That was an instance.
. The instance to which you refer is that of Emery, is it not, on -roll ending June 17, 1887, Champlain avenue west?—A. Yes, sir, was the one. You asked me if there was any other instance where name would occur.
. You knew Mr. Emery to be a contractor, did you not?—A. Yes,

. And that this money was being paid to him on account of the con-t between him and the original contractors?—A. I knew that it was g paid to him, but not for what purpose.
. It was on that contract?—A. Yes, sir; it was on that contract.
. As I understand, you did not know John Smith?—A. No, sir.
. And you never handed these envelopes to John Smith?—A. That ey may not have been put in envelopes.
. How would it be passed out, then?—A. Mr. Emery might have e, as over and over he did, and got that money and had it charged im on the books, $30. Mr. Emery might have asked for $25, with ructions to put it on the check-roll as John Smith.
. How about the other instances to which I have called your atten-, in which $25 and Emery's name do not appear at all?—A. It ght have been the same; I couldn't say; and it might have been put envelopes.
. Do you remember any instance in which Mr. Emery or Mr. Pal- came to you and asked for $25, directing you to put down the name John Smith?—A. No, sir; I don't.
. Why, then, do you assume that that might have happened in that when you remember of no instance in which it did happen?—A. ell, because it is possible that he might, and I know of an instance in ich Mr. Emery has come into the office and got money in his own ne and had it put on.

By the CHAIRMAN:

. Had it put on how?—A. Had it put on the check-roll as paid to ery.

Q. Then that entry was according to the truth, was it not?—A. sir.

By Mr. FAULKNER:

Q. Do you think, considering the character of business that you engaged in during the eight months you speak of having been the 1887, that you could have indorsed or have paid to John Smith s four times during those eight months a total sum equal to $734 wit having your attention called to the fact.

The WITNESS. That I could have paid it to him?

Mr. FAULKNER. Yes.

A. No, sir.

Q. Or that it could have been paid to any fictitious person and not have your attention called to the fact that there was not any person on the work?—A. No; I don't.

Q. Then you think, if these facts appear, you must have known this payment was made and to whom it was made?—A. No; I do

Q. What then do you mean by your answer?—A. Just ask me question again, if you please.

Q. I say, assuming that during the eight months of 1887, when work was going on to which allusion has heretofore been made, were sixty-four payments made to John Smith, aggregating the su $734, equal to $91.75 a month, do you think those payments could been made to John Smith, or to a fictitious name for any one else, out you having suspicions or knowing something about it?—A. Yes

Q. How could it?—A. By my paying John Smith, if a man by name of John Smith would call for an envelope, part of the time paying Mr. Emery part of the time.

Q. Did John Smith ever call for an envelope at the office?—A. sir; not to my knowledge.

Q. Do you know whether John Smith ever called for an envelo any time when you were passing through the tunnel?—A. Not tively. No, sir; I don't.

Q. Do you know whether John Smith ever got one of these lopes?—A. I do not.

Q. Is it not a fact that you handed the envelopes for these inspe to Mr. Palmer, to be delivered by him to them?—A. No, sir; it is

Q. Have you never given any of them to Mr. Palmer to be deliv to the inspectors?—A. Not to be delivered to the inspectors; no, s

Q. To be delivered to John Smith or John Night?—A. I don't k that they were to be delivered to John Night or to John Smith don't know who they were to be delivered to.

Q. Do you know any man who got any one of the sixty-four ments during those eight months that were payable to John Sm according to those books?—A. No, sir; I can't recall one name.

Q. It all passed through your hands, did it not?—A. No; I know that all of it did. No, sir.

Q. Were not all these payments made on these pay-rolls thr you?—A. No, sir; not all of them.

Q. Whom else were they made through?—A. Mr. Heitmuller s times assisted me in paying.

Q. In what way did he assist you—to what extent?—A. If I d have time to go from one end of the line to the other, and he was at time going through a particular shaft, I would give him the envel for that shaft.

Q. I want to understand this, because this is a matter that st my mind in such a way that I want an explanation from you.

ould there be sixty-four payments during those eight months made to ohn Smith—who, we assume, was not in the tunnel—without exciting our suspicions, that they were simply gotten from you by the contract-rs and not to be handed over to John Smith? Did not the fact that ere was a particular name on the pay-roll and that the man of that ame was not present when you went through the tunnel excite your ttention?—A. Certainly my attention was called to it; I knew that hese envelopes were going to him, but, as I say, for who they were I idn't know; it might have been for Mr. Palmer's own benefit, or the ubcontractors', or whoever they might have been.

Q. Then you think they did go to Mr. Palmer or Mr. Emery?—A. 'hat I don't know, whether they did or not; some of it did I know, but whether it all did or not I don't know.

Q. What became of all of them that you delivered in favor of John mith?—A. I say some of them went to Palmer, and I don't know but ll of them, and I don't know as all of them did. In paying men in he tunnel it is possible I may have given John Smith an envelope, and here may have been two or three John Smiths.

Q. Would it not have surprised you a little during that period to ave given John Smith three times an envelope containing $33 and 30 at another time? Would not such large payments as that have ttracted your attention?—A. No, sir; because I made payments that ere equally as large.

Q. And although you never handed an envelope to this particular ohn Smith that you can recollect of, or to any one representing himself s John Smith, it never excited your attention that you made payments o John Smith altogether to the amount of $734?—A. It did excite my ttention, yes, sir.

Q. When your attention was excited with reference to it, did you ake any investigation or inquiry?—A. No, sir; I didn't consider it my usiness or duty. As I before said, the money belonged to Mr. Palmer, nd Mr. Palmer's earnings were enough to cover what he received from hat was on the check-roll, and the total amount was charged up to im.

Q. Then why was it so necessary to preserve a regular pay-roll weekly howing the exact number of days that each man worked in order to eep the accounts properly between Beckwith & Quackenbush and 'almer & Brennan?—A. I don't know why it was necessary, only it as the custom.

Q. You did not mean to say in your answer just now that any of these ayments to John Smith had been charged over to Palmer individu-lly?—A. No, sir; I did not.

Q. But they were simply payments on the contract?—A. Yes, sir. he check-roll is a payment on the contract.

By Mr. DAWES:

Q. You do not know that John Smith ever got one of these sixty-four nvelopes, do you?—A. No, sir; I don't know that.

Q. And you do not know who did get one of them, except Mr. Palmer, o you?—A. No, sir.

By Mr. FAULKNER:

Q. On pay-roll, March 11, 1887, Howard University, in whose hand-riting is the name of John Smith, packer, opposite the words "Omitted ast week?"—A. That is mine.

Q. Is that the same John Smith that we assume to be a fictitious erson?—A. I couldn't tell you whether it is or not.

Q. Whose handwriting is the balance of the pay-roll in?—A. T
are in Mr. Heitmuller's, except down to L. A. Emery; I judge f
that that Mr. Emery had instructed that to be done.

Q. That is the name of the contractor, is it?—A. Yes, sir.

Q. Have you any recollection on whose authority that was indo
by you?—A. Mr. Emery's, I think. Mr. Brennan was away at
time most of the time. I had no authority from any one except
Emery to put anything on the check-roll without it appeared in
time-books.

Q. Then, as I understand you, your recollection is that you had
authority of Mr. Emery for putting it down, both as to himself and
John Smith?—A. Yes, sir.

Q. Using the language, "Omitted last week"?—A. Yes, sir.

Q. And carrying out the pay-roll?—A. Yes, sir.

Q. Do you remember any conversation that occurred at that
between you and Emery as to who John Smith was?—A. No, si
don't.

Q. On pay-roll, March 11, 1887, there appears again the nam
John Smith, packer, twice, and also in the column for the work
per day the language "Omitted last week;" in whose handwritin
that?—A. That is mine also.

Q. Under whose authority did you place that entry upon t
books?—A. Mr. Emery's.

Q. Why do you say it was upon Mr. Emery's authority?—A. Bec
nobody else had authority to instruct me to put it there; I put it t
under nobody else's authority.

Q. Have you any recollection of Mr. Emery giving you any
authority in this particular case?—A. No, sir.

Q. You just assume, then, that he did give you authority because
would not have done it unless by his authority?—A. Yes, sir.

Q. Would you not have done it by the authority of his partner?
Yes, I would; I say his partner was not here during that time but
little, and he might have been here at that particular time, a
would have done it on his authority.

Q. Then you do not know whether it was on the authority of
partner or himself?—A. No, sir; but one of the two.

Q. You only assume that that is the reason for it, because you w
not have done it upon the authority of any one else?—A. Yes.

By Mr. DAWES:

Q. Here was a man omitted last week whom you had never see
heard of; is that so?—A. I don't understand you.

Q. This is the same John Smith about whom you have made t
entries under the direction, you think, of Mr. Emery, and he is the s
John Smith whom you have testified that you never saw or heard.—
don't know that it is the same John Smith; no, sir.

Q. Did you ever know or hear of any John Smith in that tunne
A. I couldn't say whether I have or not.

Q. You can not tell whether you have ever seen or known a John S
in that employ?—A. No, sir; I can not; I think, though, that I h

Q. Can you tell whether you had ever seen or heard of the J
Smith represented by these words that Mr. Faulkner has called
attention to?—A. I can not.

Q. In the sixty-four entries of payments to John Smith, to which
Faulkner has called your attention, is there any one of them that
know the person whom the name represents?—A. No, sir.

Q. Or ever heard of?—A. I don't know that there is.

By Mr. FAULKNER:

Q. Mr. Witness, will you answer me whether you can explain or give
ıy reason for the fact that appears in almost every instance, not every
ıe, that the name of John Smith is written in pencil, whereas all the
st of the pay-roll is written in ink?—A. No, sir; I can not. I don't
ıow of any reason why it should be, without it was the instructions of
me one to put it down after the check-roll was made, and there was
doubt as to whether it should go on the check-roll or not.

Q. In whose mind would that doubt exist that would cause that?—
. It would exist in the mind of whoever was making the check-roll.

Q. Is it not not rather strange that that doubt should have existed
r the period of eight months without causing any inquiries for expla-
ıtions of those who made up the pay-roll?—A. I should think it was,
es; but the rolls were made by different ones; they were not all made
one person.

Q. Is it not strange that all who made the pay-rolls should make
ese entries in pencil?—A. I don't know as to that, whether they are
pencil or not.

Q. They are all in pencil except two or three. Does not that indicate
at that is a name that should not have been put on without special
rection?—A. I think it did; yes, sir.

Q. And the fact that it was a name that was only put on by reason
special orders from those having authority did not excite any sus-
cion at all or excite any curiosity upon your part to ascertain who this
rty was?—A. It wouldn't excite any curiosity on my part, as I know
, where it was put on by me; it might have excited my attention, or
y attention might have been directed to it.

Q. Assume it to be a fact that John Smith's name appeared upon the
gular returns of the time kept by Mr. Heitmuller, what reason would
ıu then give for putting the name down in pencil?—A. I don't know
there would be any reason for putting it down in pencil.

Q. Do you know whether or not that is the fact, that John Smith's
me was returned on those regular weekly time-books of Mr. Heit
uller?—A. No, sir; I don't know whether that is the fact or not.

Q. You can not remember whether you did or not transcribe this
ll from that time-book, including the name of John Smith?—A. I
n't know that I ever transcribed this roll from his time-book. We
d different methods of doing it. At times he would write them, and
ıere it appears in my writing he would call the names off to me and
ll the time off.

Q. That was taking it from those books?—A. Yes, sir.

Q. Where are those books?—A. I think they are in the office; I
ven't seen them for some time; I don't know.

TESTIMONY OF NELSON J. DAVIS.

TUESDAY, *December* 18, 1888.

NELSON J. DAVIS, sworn and examined.

By Mr. FAULKNER:

Q. What position did you hold during the time that Beckwith &
ıackenbush were engaged in the excavation of the Washington Aque-
ct tunnel?—A. I have been book-keeper for them.

Q. From what time to what time were you a book-keeper for them?
A. I have been at work for them six or seven years.

Q. Will you state from what time to what period?—A. I cam here, I think, in November, 1883, when they commenced work her got here after they had commenced work.

Q. And you have been in their employment as book-keeper since?—A. Yes, sir; I have been here most of the time; I have two or three vacations and been away.

Q. What relation did you have to the pay-rolls under the sub tract which was made by your employers with Brennan & Palme Brennan & Emery?—A. I didn't have to keep the check-rolls, not erally; I have helped them if they were short of help, and when got up the footings and made the statements I got the money for t

Q. What do you mean by check-roll—the book kept by the t keeper?—A. Yes, sir.

Q. Did you assist in making that up at any time during the 1887?—A. I presume I did sometimes, whenever they were shor help.

Q. How did you assist, by going through the tunnel and ascer ing what men were at work?—A. I never was in the tunnel in my and I never kept any time.

Q. In what way then did you assist in keeping the time-book? You know it is copied from the time-book on to the check-roll; s times the time-keeper would call off his time, and I would write he was short of help, and make up the amount for the payments the week.

Q. Then, as I understand, all that you did was to take off the amo from the check-roll, or the time-keeper's, book and put them upon books kept by the firm, one of which, for example, was No. 2, ma P. F. Brennan?—A. Yes, sir.

Q. That was the class of entries that you made?—A. Yes, there are some of my footings and recapitulation.

Q. Whose handwriting is that for the week ending Friday, Febr 25, 1887, Howard University?—A. That is Heitmuller's writing cept the "John Smith;" I put that down.

Q. Where did you get the name of John Smith?—A. From Mr. ery, or else—I don't know; I think it was Mr. Emery wanted money and wanted it put on the check-roll under that name of Smith.

Q. Am I to understand you as meaning to say that John Smith st for Emery?—A. No, sir; I don't know whether there was any Smith there; but he wanted me to advance him the money, and might have been given to me at the time. You could tell by loo on the small time-books.

Q. If it was on the small time-book, you must have got it from o sources than the time-keeper?—A. I got it from Mr. Emery; yes telephoned down that he wanted some money, in several instanc think; and then he used to be in the office and tell me to enter it u the check-roll to John Smith; I don't know whether he used the m himself or paid it to somebody.

Q. In whose handwriting does the name of John Smith appear i entry for Howard University, week ending Friday, February 18, 188 A. That is my writing.

Q. On whose authority did you put the name John Smith in thi try?—A. Well, sir, I think it was Mr. Emery. That reads "three w to date."

Q. Twenty-four dollars?—A. Yes, sir.

Q. That is all your handwriting?—A. Yes, sir.

Q. Have you any distinct recollection of Mr. Emery's telling you that ohn Smith was entitled to that amount of compensation for those three eeks?—A. He told me to put in this amount to John Smith. He anted some money.

Q. To whom was that money turned over. Do you know?—A. I ink to Mr. Emery.

Q. Did you have anything to do with turning over the money?—A. t would be put up in the envelopes.

Q. Who took those envelopes from the office to the parties to whom ey were addressed?—A. The paymaster and the time-keeper used to ke them down to the shafts.

Q. Who were the paymasters?—A. Mr. Heitmuller took money out, nd also Mr. Leroy.

Q. In whose handwriting is the name "John Smith," and carried ut "$8," for the week ending Friday, March 18, 1887?—A. That is y handwriting.

Q. Also for the week ending Friday, March 18, 1887, Champlain venue?—A. That is mine.

Q. In whose handwriting is the name "John G. Cleveland," for the eek ending Friday, April 1st, 1887, Howard University, and carried ut "$10"?—A. That is mine.

Q. Do you know who John G. Cleveland was?—A. No, sir, I don't.

Q. Do you know of any man being employed in those works by that ame?—A. I do not; I never saw him.

Q. By whose authority did you put him on the pay-roll?—A. It must ave been the time-keeper.

Q. And if the time-keeper's book does not show the name of John . Cleveland, by whose authority, then, did you place it there?—A. I ouldn't recollect.

Q. That was paid, was it not?—A. Yes, sir.

Q. In whose handwriting is the name John Smith, packer, who ap- ears to have worked Saturday or Sunday, Monday, Tuesday, and Wed- esday of the week ending Friday, April 15, 1887, and carried out 8?—A. That is mine.

Q. From what source did you obtain the information upon which you ade that entry?—A. It must have been from the time-keeper or Mr. mery.

Q. In whose handwriting is the balance of those entries on that age?—A. In Mr. Heitmuller's.

Q. If you did not obtain that information from the time-book, then, ou think, it came from Mr. Emery?—A. Yes, sir; I wouldn't say cer- ainly which one it came from; but I would not have put it down there ithout authority from some one.

Q. Rock Creek east, night, week ending April 15, 1887; in whose andwriting is that?—A. That is mine. "Error last week, $6.75," that s my handwriting, too.

Q. Whose handwriting is the name John Smith, packer, four days, eek ending April 15, 1887, Chaplain avenue, carried out $8?—A. hat is mine.

Q. The same name, John Smith, Rock Creek, night, week ending pril 22, 1887?—A. Yes, sir; that is my handwriting.

Q. In whose handwriting is the name John Smith, packer, for week nding Friday, April 22, Howard University, carried out $16?—A. . That is my handwriting.

Q. What is the meaning of these entries as they appear on the ooks?—A. Two days or a day and night, Saturday, two shifts.

Q. Did you suppose at the time those entries were made that man had work two full days or a night and a day?—A. I don't remem

Q. Do you remember whether you got that information from time-book?—A. I don't know that it was on the time-book or whe it was reported to me by the time-keeper or by Mr. Emery; but I th Mr. Emery gave me the time.

Q. In whose handwriting is the name John Smith, packer, for week ending Friday, April 29, 1887, Champlain avenue?—A. Mine

Q. The entry there shows "short last week four days;" does not entry for the week ending Friday, April 22, 1887, show that he wou there four days?—A. Yes, sir.

Q. Do you remember upon whose authority you made that entry A. That is not my handwriting over that.

Q. Whose handwriting is that?—A. I don't know, unless it is Heitmuller's.

Q. In whose handwriting is the balance of that pay-roll?—A. Heitmuller's.

Q. Whose handwriting is "John Smith, packer, week ending Fri April 29, Howard University?"—A. That is mine, sir.

Q. And whose handwriting is the balance of the pay-roll?—A. H muller's, I think.

Q. In whose handwriting is the name John Smith, packer, H Creek, east, night, week ending Friday, May 6, 1887?—A. Mine.

Q. In whose handwriting is the balance of the pay-roll on that pag A. Heitmuller's.

Q. Were you aware of the fact that any of the subinspectors on work were being paid?—A. No, sir.

Q. You were not aware of their being paid any compensation at al A. No, sir.

Q. You did not know, then, anything about the payment of cer subinspectors under Emery & Brennan, and subsequently Brenna Palmer, for overtime or for any other reason?—A. No, sir; I did no

Q. Did you ever hear of there being any payments made under f tious names?—A. No, sir.

Q. I see, in running over book No. 2, that a great many of these tries for the payment of John Smith are made in your handwritin lead pencil, the balance of the pay-roll being entered in the handwri of Heitmuller. Did not that fact ever excite your curiosity or at tention?—A. Well, I don't know that it did. This was charged u Emery & Brennan's account; we were owing them and he wanted time put in.

Q. Did not Mr. Emery ever give you any reason why the nam John Smith, which was so frequently omitted from the time-book, not on there?—A. No, sir; he did not. He used to telephone d from the shaft, and was there himself most every time that we pai

Q. And he never alluded to the coincidence of his name not being tered on the time-book, and continually suggesting to you to put i afterwards?—A. No, sir.

Q. And you never asked him any reason why?—A. I did not. wanted the money, and wanted it put on in that way.

Q. You never had any conversation with him in reference to the ject?—A. I think not, particularly; I don't recollect any. I kno was paid on the check-roll and put up the same as the other envelo

Q. Was it not the understanding between your employers and subcontractors that the pay-roll should present the true state of f as to the number of workmen, the number of days they worked,

e compensation they were receiving?—A. Well, I suppose it would e proper to put the time in.

Q. Was not that the understanding, I mean, between Beckwith & uackenbush and these sub-contractors?—A. They were paid all their eck-rolls.

Q. They could only receive from the original contractors what ap-eared on these pay-rolls, could they?

The WITNESS. How is that?

Q. Do you know any other payments made to them than those that ppeared on these pay-rolls?—A. No; not unless they wanted some oney for themselves on check or something; if they wanted to use me money I would give it to them.

Q. And that would not appear on the pay-rolls?—A. The checks ere all entered up in their account.

Q. What were your instructions with reference to this subject? Were ou not to pay the men that were employed by these subcontractors? -A. Yes, sir; I paid them men; made a check for the amount of the eck-roll.

Q. Were you authorized by your employers to pay any one for the bcontractors except men employed in the tunnel by them?—A. I on't know as I was particularly. There was an understanding about at.

Q. If that was the understanding between the parties, how is it that did not excite your curiosity when these time-books were returned frequently without the name of John Smith, and Mr. Emery subse-uently requested you to put that name on the pay-roll?—A. Mr. mery could explain that better than I could; I don't know whether ere was a John Smith, and I don't know whether John Smith got the oney or whether Mr. Emery got it himself.

Q. I suppose you were acting for Beckwith & Quackenbush in this atter?—A. Yes, sir.

Q. You were guarding their interests, were you not?—A. Yes, sir.

Q. And your instructions, as I understand, were to pay the men em-oyed in the tunnel by these subcontractors?—A. Yes, sir; to pay e check-roll.

Q. If the check-roll returned by the time-keeper did not show the me of John Smith, and you assumed the authority to put that name there so frequently, is it not strange that it did not excite your atten-on?—A. Well, I knew we were owing them; I didn't know what uld be wrong about it if he wanted to put it on in that way on the eck-roll and have it charged up to him.

Q. If he had ordered you to pay to John Smith $1,000 would you ve done it without inquiry?—A. No, sir; I should think that a boring man couldn't earn that much.

Q. Do you think a laboring man would ordinarily earn $25 in one eek?—A. Some earn more than that, I suppose.

Q. But they would be foremen or masons, would they not?—A. Yes, r.

Q. Then, as I understand, from what you say, you were not guided d controlled in your pay at all by the time-keeper's books, but by r. Emery, and if he had ordered any name to be put on there for any asonable amount you would have put it on without inquiry?—A. I n't know but what this was paid to John Smith. Mr. Emery re-ested that it should be paid and charged up in his account.

Q. And you had no conversation at any time with Mr. Emery, ask-

ing an explanation of the fact as to why John Smith's name did not pear on the pay-roll?—A. No, sir; I don't recollect any.

Q. You took no receipt at any time from Mr. Emery for any of th payments?—A. No, sir; they were all charged on the account.

Q. You never took any receipt for the payment of John Smith?— No, sir; I never took any receipt for payment to any of the labor

Q. Or no receipt for payments to a person by the name of Woo Night?—A. Not that I know of. On the check-roll?

Mr. FAULKNER. Yes.

The WITNESS. Is it in my handwriting?

Mr. FAULKNER. I am not able to state whether the entries ar your handwriting or not.

The WITNESS. I could tell if I was to see.

Q. But without any memorandum you have no personal recollec of taking any receipts for any of these payments?—A. I have not.

Q. Did you ever have any conversation with Mr. Heitmuller or Leroy in reference to the payment of men under fictitious names?— No, sir; I think not; I don't recollect any.

Q. Do you know of any one else who directed you to make ent other than Mr. Emery?—A. No, sir; I do not; unless the time-kee Mr. Heitmuller, should have got word to me.

Q. If he had done that it would have appeared on his time-b would it not?—A. Yes, sir; it ought to. They are entered up in s of these books. The time-keeper would call off when he was sho help, but I didn't have to keep the time-books. I can tell all my v ing.

By Mr. RYAN:

Q. You have been keeping all the accounts for Beckwith & Qu enbush for several years, I understand?—A. Yes, sir.

Q. You have kept the accounts of money received by them and mo paid out in regard to this aqueduct tunnel business?—A. Yes, sir.

Q. Did you keep the account of moneys received by them from Government work?—Yes, sir; it is all entered on the books. I ha copy of the reports coming from the Government, and they are ent on the books and entered up on the accounts.

Q. You entered them upon your accounts?—A. Yes, sir.

Q. And you also kept an account of all money paid out for all poses?—A. Yes, sir.

Q. Did you keep an account of moneys paid to Beckwith and Qu enbush, respectively?—A. Yes, sir; they had a private account.

Q. Were there other partners in that contract, other parties inte ed in that tunnel with Beckwith & Quackenbush?—A. There silent partners.

Q. Who were they?—A. I think Peterson & Co.

Q. And you kept an account of the moneys paid to those silent p ners?—A. Yes, sir.

Q. Did you keep an account of all moneys paid out to any o parties than to Beckwith & Quackenbush and the silent partners were not actually employed on the work in some way or another?— No; I have no recollection of any.

Q. Have you with you here the accounts of moneys paid out to silent partners?—A. No, sir; not here. They have had different wo

Q. I am speaking of this one work. Have you those books sho payments to the silent partners?—A. Yes, sir.

Q. Can you bring them here?—A. I suppose I can bring the have not the key to the place now.

Mr. RYAN. Please bring them down to-morrow morning at 10 o'clock; ease bring all that will show payments that have been made to those ent partners, whoever they are.

The WITNESS. Very well, sir.

Q. You are quite clear that you kept no account of moneys paid out any other persons than to those silent partners, except those that re actually employed on the work?—A. No, sir; I did not.

Mr. RYAN. You bring to-morrow morning the books that will show e accounts of moneys paid out to all parties claiming to have any in- rest whatever in that contract.

The WITNESS. Very well.

By Mr. FAULKNER:

Q. I do not understand you as meaning that you did not pay money these subcontractors individually?—A. Their account shows every- ng that was paid to them.

Q. I mean other than what you say was paid on the pay-rolls?—A. ey have been settled with in full; Brennan & Emery were settled th when the Government accepted some of the work; at least they re paid the percentage, 10 per cent., I guess on, I forget how many ousand dollars, but quite an amount; and we settled with them at e same rate at that time, and since that we have paid them their per- ntage. Mr. Emery, I understand, is in a hospital somewhere, nearly ad.

Mr. RYAN. I did not mean to inquire about those not engaged on the rk.

The WITNESS. But their accounts and check-rolls show what money ey have had, and the balance was paid them.

By Mr. RYAN:

Q. Do you know whether Beckwith & Quackenbush had any person persons engaged as agents or attorneys in connection with procuring e contract for this aqueduct tunnel work?—A. That I don't know.

Q. Do you know of any account of any moneys paid to such persons agents or attorneys?—A. I don't recollect now; they may have paid ney, but if they did it is charged up.

Q. If they paid any money you have kept an account of it as their ok-keeper, have you not?—A. Yes, sir.

Q. If there are any such accounts, will you bring them with you to- rrow morning?—A. Yes, sir.

By Mr. CLEMENTS:

Q. Were you employed by Beckwith & Quackenbush before they got s contract?—A. Yes, sir; I was on the Little Falls work, on the West ore Railroad.

Q. Had you been in Washington before that?—A. I had never been re before that; no, sir.

Q. Do you know whether Beckwith & Quackenbush, or either of em, or either of their silent partners, were here before the contract s made?—A. I don't know; I know they came here to bid on the rk.

Q. If they came here, the expense they would incur in that matter uld be a matter of account on your books, would it not? The one t came would receive his expenses?—A. Yes, sir; I don't know as would then, when they came from Little Falls; of course if they spent ney there it was entered up in their account there.

Q. Did you keep the books there?—A. Yes, sir; I used to write u the check-rolls there and pay the men. We had 1,500 men there at wor

Q. Have you any recollection of charging up to either of the pa ners, ostensible or silent, any moneys expended on account of t Washington Aqueduct work while you were there?—A. I don't kno there has been expenses of different kinds charged to the expen account, I guess, for money paid out; I don't know what they paid it fo

Q. The books would not show what it was for?—A. It would be ca paid to them.

Mr. CLEMENTS. I wish you would bring them here to-morrow als

The WITNESS. Yes, sir.

Q. You do not know whether any of them were here between the ti they bid on the work and the time the contract was let to them, or not? A. I don't think they were, but I don't know. They used to go knocking around the country after different pieces of work.

TESTIMONY OF P. F. BRENNAN.

TUESDAY, *December* 18, 1888.

P. F. BRENNAN, sworn and examined.

By Mr. FAULKNER:

Q. Where is your residence?—A. 1848 Washington avenue, New Yo City.

Q. Were you connected at any time with the construction of t Washington Aqueduct tunnel here?—A. Yes, sir; I had a subcontra to do the brick work, masonry, and concreting.

Q. At what time did you enter into that contract with Beckwith Quackenbush?—A. The last of February, 1885, I think it was; started work on the 1st of March, 1885.

Q. Had you any partner with you at that time in that subcontract? A. Not when I first started.

Q. Had you any at a subsequent time?—A. Yes, sir.

Q. Who?—A. I had a man named L. A. Emery from the 1st of Ju 1885, until last October a year ago.

Q. When did you cease to be a subcontractor on these works?— When the work was stopped this fall.

Q. Had you at a subsequent time any other partner than Mr. E ery?—A. Yes, sir; a man named John F. Palmer.

Q. When did you dissolve the first partnership and enter into t second?—A. Last May.

Q. As soon as you dissolved with Emery, then, as I understand, y entered into a contract with Palmer as subcontractor?—A. Yes,

Q. And that embraced the same character of work as you have ready stated?—A. Yes, sir.

Q. What personal supervision did you have over this work?— Well, for the first three years I had very little; I wasn't here muc I was in the East. I was here the first two months, March and Ap and Mr. Emery and a man named Greene said they would do the wo for me. They worked about a month at it, and then they quit it, a I said I would go ahead and do it myself. At that time I was do in Connecticut doing some sewer work. Then I run it along fr March, April, May, and June, and then Mr. Emery was going to qu and I was doing a great deal of work down there, and I couldn't g my attention to this work down here, and so I told Mr. Emery tha

he would stay and look after this work I would give him an equal interest in it with myself.

Q. Then it was under your personal supervision about four months?—A. No, sir; for about two months.

Q. March, April, May, and June, I understood you to say?—A. Yes, sir; but Mr. Emery was here the latter part of March; he came on here and I left him in charge. I used to be in the East, doing work there. Greene and him was going to do the work here for a little less than I was doing it for, but they didn't get along very well together, and Greene drew out, and then I told Emery to stay and I would pay him wages; and along about the 1st of July or June—I think it was in June—he thought he ought to have more money, and I told him, "I can't be here;" and I said, "You stay here, and I will give you an interest in it from the 1st of July."

Q. Then from the beginning of the work up to July you had to some extent a personal supervision over the work?—A. For about two months, building Howard University shaft and what we call the west shaft. There was no tunnel work done in them two months. It was some time after that—I don't remember exactly when—that they started to do the lining of the tunnel.

Q. What personal supervision, if any, have you had over the work since July, 1885, either with Emery or with Palmer?—A. I used to come on here, as I say, perhaps once in two or three months, and perhaps sometimes I would come once a month, but Mr. Emery looked after it altogether. I was doing sewer work East.

Q. How long would you stay when you came here those times?—A. Perhaps sometimes I would stay two or three days, and sometimes I would come Saturday night and go away again Sunday night; I would see Mr. Emery and go away again.

Q. What examination of the work did you make, if any, during the time that you would remain here?—A. Not much at all. I placed all the confidence in Mr. Emery that could be placed, and of course, he being an equal partner, he took as much interest in it as I could.

Q. And was Mr. Palmer also an equal partner?—A. Yes, sir.

Q. And he then stepped in the shoes and assumed the duties that had formerly been performed by Mr. Emery?—A. Yes, sir; except the tunnel shaft. I stopped here all last season myself from, I guess it was, about the 22d of May. They started in the work here, I think, about the 9th of May last year, and I went down home and stayed there for perhaps a week, or may be two weeks, and then when I came back I went to work over at Foundry Branch and staid there myself almost all the time. I very seldom went through the tunnel. Mr. Palmer had a horse and buggy, and confined his operations mostly to Howard University, Champlain avenue, and Rock Creek, and I stopped over at Foundry Branch shaft almost all of last summer.

Q. Did you have charge of the workmen there last summer at Foundry Branch?—A. Yes, sir.

Q. What work did you do in Howard University shaft when you were at work there two months?—A. Only the shaft. There wasn't any tunnel work done in them two months. We worked on what was called the west shaft, out there by the Drovers' Rest, by the old reservoir, and at Howard University. Some time that summer they started, I think, in Champlain avenue—I wouldn't be certain—started doing the tunnel.

Q. You did no lining or packing, though, during the time you were here in 1885 in the tunnel, of course?—A. No, sir.

Q. Then, as I understand, you returned in 1888, in May, yourself
A. I was here in the fall of 1887; not a great while, though. I
here when they shut up the work. I might have been here a couple
months perhaps. I think they closed up about the 1st of Octob
1887, or somewhere about there; I don't remember exactly.

Q. What kind of supervision did you give the work in 1887 wh
you were here?—A. Not much at all.

Q. You had no charge of any of the gangs that were working in
tunnel, had you?—A. No, sir. I was laid up with rheumatiz all al
pretty well, and I couldn't go into the tunnel; and the first year I ca
on I was under an eye doctor on New York avenue—I can't remem
his name just now—but he has moved from there now and is up on
street. My eye hurt me considerably, and he advised me to go in
tunnel just as little as I possibly could. I told him I could stay out
the tunnel a good deal, because I had a partner that looked after
business with me.

Q. Did you notice any bad work of any kind in the tunnel in 1
when you were here?—A. I did not.

Q. Your attention was not called to it during that year?—A. I
sir; never.

Q. At what points in the tunnel from May, 1888, up to the quitti
of the work, did you supervise?—A. Foundry Branch shaft, both e
and west headings.

Q. Who were the inspectors at that time in Foundry Branch shaft
A. I think the first inspector we had was a man named Masters or I
Masters, I forget which; and then there was a man named Rouzee a
a man named Fisher, and then a man came in there and stopp
about a month, and his name was Malone.

Q. During 1888 the packing was to be laid in cement, was it not
A. Yes, sir.

Q. Can you state to the committee whether you know of any imp
fection in the work during the time that you were supervising at Found
Branch shaft?—A. There was at one time. Colonel Kirlin caught a m
putting in dry-stone work instead of cement mortar.

Q. At what point was that?—A. It was on the east heading.

Q. Do you know the extent of that defective work that Colonel Kir
ascertained had been done?—A. It wasn't a great deal; I don't th
there was above three or four or five feet of it; it was a very shall
place; that is, it wasn't very high, and perhaps it wasn't more th
four or five feet long. He caught him, and it was remedied and fix
up all right.

Q. That was on the side, was it not?—A. No, sir; it was up in
key, as we call it.

Q. At that time Mr. Masters was a subinspector, was he not?—
Yes, sir.

Q. You do not remember of any other circumstance under Mr. M
ters during that summer?—A. No, sir; I do not. He didn't stop th
after that. He was discharged or quit himself, I am not sure which

Q. Do you know of any imperfect work being done there just a sh
time prior to the time that Mr. Masters stopped?—A. I think there w
some done over at Rock Creek after that. In that shaft, you mean

Q. In that shaft.—A. No, sir; I don't.

Q. You do not remember of Lieutenant Townsend calling Mr. M
ters's attention to some imperfect work at that point?—A. I do not

Q. You never heard of that?—A. No, sir.

Q. Did you act as foreman of these men, or did you just give general supervision?—A. General supervision.

Q. How much of the time during the working hours of the day were you with the men at the points where they were working?—A. I was on the shaft all day, from half-past 7 in the morning until about 4 or half-past 4 in the afternoon, perhaps half an hour or so before they would quit work. I used to be down in the tunnel, and if any material was wanted to keep the work going I would go up to see what was the matter. I should judge I was down in the tunnel about four or five hours out of the nine, may be not that long; perhaps sometimes may be I would be there longer.

Q. You do not know the number of the stations running from those shafts, do you?—A. No, I do not; in fact they didn't have them numbered as they went along and didn't have them numbered until after the work was keyed; I believe then they numbered them every 100 feet, but I couldn't go there and say where the places were.

Q. Did you have any other foremen than those in charge of those gangs that were working in the east and west shafts?—A. I had a foreman over the stone-masons, but none over the brick-layers or packers. As a general thing the brick-layer kept away ahead of the packers, and there was sometimes three and four packers at work; one brick-layer kept ahead. It was only two-ring brick-work, and it was so light that one man kept away ahead of the packers; then again in some places, where it was heavier, especially in the east heading, the brick-layer wouldn't be so far ahead.

Q. Could any large cavity have been left, either on the sides or over the key of the arch, you being in the tunnel about on an average of five hours a day, without you knowing it?—A. I don't think there could.

Q. You would have had an opportunity of ascertaining whether or not the packing was being done properly?—A. Well, sometimes the stone-masons would be working over on the east heading and the brick-layers would be working on the west. We couldn't keep them both working together, because we couldn't get material for them both at the same place and run out the muck. We tried to keep both gangs going. I might for two or three hours be with the stone-masons, and then go where the packers were at work; the distance would probably be from 1,000 to 1,500 feet.

Q. From your experience could you not tell whether or not these men that were packing were going too rapidly to accomplish good work in the length of time between the time you would leave and the time you would return?—A. Sometimes the packing would be very heavy; you could tell then; but where the packing would be light, perhaps it would be only about 8 inches over the arch or around the sides, but, as a general thing, at the haunches of the arch (that is, the springing line where we started) it would be pretty heavy there, and there they had a great deal more work, and also they had where it was 4 feet up above the crown of the arch, because there they would have to lift the stone so much higher, and more men were required to be in attendance to do it.

Q. Still, as an expert contractor, you could take all that into consideration, could you not?—A. Well, I don't know as I could. Some men work a great deal faster and better than others.

Q. You became acquainted with the character of the workmen and their capacity for work, did you not?—A. Yes, sir; but we used to have to change, because if the inspectors found a man doing anything wrong they would put him away.

Q. You stated just now that you had not had any intimation of a body doing anything wrong except in one instance.—A. Well, perh they might drop a stone in dry, only one stone, and then the inspe would let him go.

Q. Do you know of any instance of that sort?—A. Oh, yes.

Q. How frequent were such instances?—A. I think there were haps four or five men discharged for that kind of work.

Q. Who discharged them?—A. I discharged them upon the orde the inspector.

Q. What inspector was that?—A. I think Mr. Rouzee did it; Malone did it when he was there the last month that he worked the I think he discharged two; whether it was for bad work or for giv him back talk I won't say now, but he had them discharged. I Mr. Briggs about it, and they were discharged. Whether it was bad work or back talk I don't know now, but I think they insulted in some way, and he had them discharged.

Q. Are you not a sufficient expert also to know whether or not th men were using a sufficient amount of cement mortar in the amoun work that they ought to have done in the cavities as you saw the the tunnel?—A. That stone there in the tunnel takes a great dea cement; they are not the same kind of stones that you have for g rubble work outside. We had to take the stones in the tunnel jus they were blown out; they were very irregular.

Q. What I want to find out from you is this: Whether you are n sufficient expert in this work to judge, after leaving the work, and kn ing the character of the work that was to be done during your abse to know whether they had done it properly by the amount they done while you were absent?—A. I should think I was; yes, sir.

Q. And your attention or curiosity was never excited by the amo of work they had done in your absence?—A. No, sir.

Q. Or the rapidity with which they had done the work?—A. No,

Q. Or the amount of space they had covered?—A. No, sir.

Q. You believe, therefore, that the work was done in a workmanl manner?—A. I do, indeed.

Q. If it should turn out that there is a large cavity above the ke the arch through that part of the tunnel it would excite your surpr would it not?—A. Yes, sir; it would.

Q. How many feet of the tunnel did you line from May until the t you stopped in those two shafts under your supervision?—A. I ju about, say, 1,200 to 1,500 feet; somewhere in that neighborhood.

Q. The only instance that came to your attention, as I understand bad work was a case when Masters was discharged?—A. Yes, sir when he left himself.

Q. Do you know anything in reference to any payment for overt or otherwise to subinspectors by your firm?—A. I understood that t were paid overtime; they were not supposed to work over nine ho and some nights they would want to work longer than that numbe hours at the other shaft. Very seldom was that done at Foundry Bra very seldom.

Q. How were they carried on your pay-rolls?—A. That I don't k very much about at all, because I didn't have no paying of any of men at all.

Q. Did you not have any partial settlement with Beckwith & Qua enbush?—A. They would settle up every month with us.

Q. Would you not go over the pay-rolls that they had paid to

ether they were correct?—A. No, sir; they would make a state-
nt to us and show what they had paid every week. I have got some
those statements here that I can show you. (Producing papers.)
Q. Those weekly statements do not embrace items in detail?—A.
, sir.
Q. But just the aggregate?—A. That is all, sir; they kept the time
d paid the men.
Q. Was it the only kind of statement you ever saw from Beckwith
Quackenbush?—A. Yes, sir.
Q. You never saw any of their pay-rolls?
The WITNESS. For our men?
Mr. FAULKNER. Yes.
The WITNESS. Oh, yes; I have seen them.
Q. Do you know whether or not these subinspectors, or any of them,
re paid under fictitious names?—A. No, sir; I do not.
Q. You never heard of that fact?—A. No, sir,
Q. Do you know how they were returned on the pay-rolls to obtain
s compensation for over time?—A. No; I do not.
Q. Did you at any time deliver to any of those subcontractors en-
lopes containing money, or money itself, in payment for overtime?
The WITNESS. Inspectors?
Mr. FAULKNER. The subinspectors.
The WITNESS. I did at one time.
Q. To whom was that?—A. A man named Lannigan; I gave him
) at one time.
Q. Was that in an envelope?—A. No, sir; I took it out of my pocket
l gave it to him.
Q. Then you never received any envelope from any inspector?—A.
, sir; never.
Q. Did Masters at any time do any overwork in the tunnel?—A. I
n't think he ever did.
Q. Did any other inspector at Foundry Branch shaft?—A. Yes, sir.
Q. Who was that?—A. Rouzee worked there over an hour, only an
ır, at night; and I think Malone worked an hour.
Q. Who paid those men?—A. I don't know whether they were paid
not.
Q. And your recollection is that each of them worked only an hour
re of over time.—A. An hour at night, and they might have worked
) or three nights' work, and they might have worked two hours, but
on't think they did; I never staid there after about 4 or 5 o'clock at
latest. The bricklayers wouldn't work after 5 o'clock, and they
uldn't allow any packing to be done only when an inspector was
re; and the brick-work used to be so far ahead that I used to tell
lonel Kirlin that the packers could work for an hour or two if he was
ling. Whether they ever got pay for it at Foundry Branch I don't
ow.
Q. Did you have any conversation with Colonel Kirlin as to whether
not these subinspectors should be paid by you gentlemen for over-
rk?—A. I don't remember certainly, but I think I had at one time;
hink I said that I didn't think it was right that the inspectors should
paid for work; that I had been on a good deal of work and I had
ver seen it done before; and I think he said this: That they were
en to understand that their hours were from 7 to 5, and anything
er that they could claim pay for if they wanted to. I think that was
drift of the conversation.

By Mr. RYAN:

Q. Who was it told you that?—A. I think it was Col. Kirlin won't be sure of that, but I think it was. I had a talk with Mr. mer this summer about it. I said I didn't like this thing of paying overtime to the inspectors, that I never saw it done. He said, "Neit did I." But to keep the work going ahead they used to work packers perhaps—in the other shaft they worked them more than t did at Foundry Branch—but at Foundry Branch I had four pack there and sometimes three, and I used to keep up pretty well. In west heading the packing was very light. If it was heavier, then t would fall behind more.

By Mr. FAULKNER:

Q. Then you knew from this conversation with Palmer that it w general practice there to pay these subinspectors for overtime?- Yes, sir.

Q. Was there any work done, except for an hour or so after 5 o'c in the tunnel at your shaft?—A. Very few times.

Q. There was no night work done there?—A. No, sir; not all ni

Q. Did it run any time until late at night?—A. Perhaps three ho except one night when they wanted to finish up a key. They wa to close the work, I believe the 1st of November, and there was a or two to key in, and there was a bricklayer stopped there, and he ke one or two bays, I am not sure which, and stopped with the pack and there was an inspector or two there. I wouldn't say for sure, didn't stay there, but I know they worked later there at night t they ever did before, but still they didn't work all night.

Q. Do you know any time when those men were working ther that shaft without the supervision of a subinspector?—A. No, never. They never would allow us to go on.

Q. There was no difficulty about a subinspector supervising that w if he was always at the place where they were working?—A. No,

Q. No difficulty in seeing whether or not the work was done in a w man-like manner?—A. No, sir; not a bit except when Masters there; I think there was only one inspector and he might have been a where the stone-masons were; but I don't remember about that; I d think he was, because there wasn't a great deal of stone-work doin that time, and I think he was with the bricklayers and packers of the time. And then the stone-work had to be kept a certain dist ahead, and they got so far ahead that they put on another inspe and worked after the stone-work altogether. He kept looking after stone-work altogether, and then Mr. Rouzee kept after the brick-w and the packers altogether.

Q. How far, when Masters was there, were the brick masons from stone-masons at work?—A. I couldn't tell; I shouldn't think they above 50 feet ahead.

Q. There would have been no difficulty, then, on the part of the inspector in passing through continuously and keeping a thoro supervision of the work, would there?—A. In Masters' case I t there would have been, because he was a pretty old man and wa able to get around fast. He had to get up on the scaffold, on the a and he was very slow in getting around. But if you put a lively there I don't think there would have been any trouble at all; tha where there was only that distance to pack.

Q. Please give us in full the conversation between you and Pal in reference to these subinspectors.—A. I think that they got pay

Rock Creek for working overtime, and I told him that I didn't think vas right, that the subinspectors should get pay for working overtime l looking after the work. He said, "I don't think so either."

Q. What were they to have been paid by you gentlemen for over-rk?—A. I think it was 50 cents an hour, the same as bricklayers re getting.

Q. If the books of account were to show—assuming this to be the t—that one inspector was paid $25 a week, do you think that would ve been at the rate of 50 cents an hour?—A. No, sir.

Q. What would have been the average payment to an inspector at ck Creek, if you know the fact, for the amount of over-work that he uld have done for a week?—A. I don't know nothing about Rock eek at all; I don't believe I was in Rock Creek shaft twice this whole mmer.

Q. As I understand you, you never heard of these inspectors being d under fictitious names at all?—A. No, sir.

Q. And you never saw there the accounts in the names of John Smith, hn Night, John Wood, or John Luke, under which names they would paid sometimes $25 a week, and at other times $15 a week, without ing any period of time when they worked?—A. Not this season, I ven't.

Q. Did you last, in 1887?—A. No, sir; I wasn't here much in 1887. as here only a short time in 1887. As I told you I was here only hort time in 1885, 1886, and 1887.

Q. Still, you certainly looked over the pay-roll paid on your account Beckwith & Quackenbush at some time, did you not?—A. No, sir; Emery was here and he looked after that thing.

Q. You never saw them at all?—A. No, sir; I would come here and w an estimate, and go away again after we had had a settlement.

Q. Did you have any conversation with Mr. Emery in reference to payment of these subinspectors?—A. No; I don't think I did.

Q. You do not know, then, that he was authorizing the payment of inspectors?—A. I did not.

Q. Had you any connection with Beckwith & Quackenbush prior to time that they obtained this contract?—A. Yes, sir; I worked for m before. I had charge for them about eight years ago of a gang laborers, and I done some work for them in Natick, Mass., about ht or nine years ago, on a dam—a little piece of connecting dam with aqueduct; an open cut.

Q. Were you in Washington prior to the obtaining of this contract these original contractors?—A. No, sir; I did not come here until bruary, 1885. I met Mr. Beckwith in New York and he asked me at I was doing. I told him I was doing sewer work in Waterbury, nn. He said, "I have got the tunnel down in Washington and would e to have you come on and see it and see if you don't want to do the ck-work." I told him I didn't think I could; that I had a great deal work. But I said, "I am going to Chicago in a short time and I will ne and see you." So I came here about the middle of February and him and went over the work, and I made a contract with him that ht. That contract I have now, if you wish to see it. [Producing per.]

Q. This is the same that we have already. Do you know any person, er than the employés under you, in that work being paid by Beck-h & Quackenbush?—A. No, sir.

Q. For any class of service?—A. No, sir; I don't.

By Mr. CLEMENTS:

Q. I believe you stated that you did not inspect these pay-ro see whether they were correct or not?—A. No, sir; Mr. Emery here; I left everything to Mr. Emery.

Q. After he went out and you and Palmer were associated tog how was it?—A. Mr. Palmer was just the same way. I stopp Foundry Branch, and at the time I just made my mind that I stop over there all the time, because I was laid up with rheumati I couldn't get along a great deal. I came here the last of Ma wasn't able to walk or put my coat on. I went into Rock Creek days, and I felt the effects of that, and my doctor told me I had keep out. I went home then, as I said, about the 9th of May, stopped there a week or two, and felt pretty good, and came Then they were just about getting ready to start on Foundry B I wasn't able to go through the tunnel, and it was a big walk over the surface, and so I made up my mind to stop right at Fo Branch. Mr. Palmer got a horse and buggy, and he said he look after Rock Creek, Champlain avenue, and Howard Univ after they got ready; and he had a foreman in Champlain ave think; that is, he used to go in every now and then and look the over, but seldom came over to Foundry Branch. I might see hi haps, once a week or might not see him again for two weeks. I see Colonel Kirlin; I think he could come every day or every day; I think it was every day; if he didn't come every day he be sure to be there the next day after he had failed to come; a Briggs would come through every day, twice a day.

Q. I do not remember whether you paid the inspectors for k time. You stated that you did for overtime, but did you for k time?—A. No, sir; I never paid an inspector, only this one ma I told you I paid $10.

Q. You do not know anything about the payment of any ot spectors for any purpose?—A. No, sir.

By Mr. FAULKNER:

Q. When did you come here? You came on from New York?—A sir; I arrived here this morning.

By Mr. RYAN:

Q. You have been in attendance here on this court of inquiry you not?—A. Yes, sir; I left New York, I think it was three wee to day, to come here for them.

By Mr. FAULKNER:

Q. You went back after you had testified before that court Oh, yes; I went home Thanksgiving.

Q. Were you acquainted with a packer named John Smith tunnel work?

The WITNESS. This season?

Mr. FAULKNER. Yes.

The WITNESS. No, sir.

Q. Or last season either?—A. No, sir; I can't go beyond that. see we had, I suppose, 150 or 160 men. Mr. Emery for three yea full charge of the whole thing.

Q. Did you know a man named John Night on this work?—A I don't remember; he didn't work where I was at Foundry Branc

Q. Or John Luke?—A. No.

Q. Or John Wood?—A. No.

Q. You knew Woodward, did you not?—A. Yes, sir.
Q. You did not know any John Wood?—A. No.
Q. You do not know whether that name, John Wood, stands for oodward or not on your books?—A. No; I couldn't say. Woodrd worked for Mr. Quackenbush while he was inspector at, I think, amplain avenue this season awhile; it was either Champlain avenue Rock Creek. All I can say is that I staid mostly at Foundry Branch self this past summer. I can talk that right along, but any other ce I don't know.
Q. I will ask you this question: You spoke of supervising the work those east and west headings at Foundry Branch. What was the gth of lining and packing on the east and west heading of Foundry anch done by you?
The WITNESS. This season?
Mr. FAULKNER. Yes.
The WITNESS. I should think there was about 1,200 to 1,500 feet ogether.
Q. But I mean how much in the east and how much in the west aft?—A. I believe there was about 1,000 feet in the east heading d between 400 and 500 in the west heading. The west was very slow tting along. The trimming was very heavy there. At some places ere was only just room enough to lay two rings of brick-work. The cking was very light on the west heading. On the east heading some it was 6 and 7 feet over the arch.
Q. Was this 6 or 7 feet caused by the peculiar character of the soil or ck and the falling in or was it caused by the contractors having used heavy charges of explosives?—A. In some places it was seamy and uld run away up. The rock is very seamy through that shaft; it uld break off, and then it would follow that seam for quite a distance.
Q. Was there any part of that work that you filled in with woodrk?—A. No, sir.
Q. None whatever?—A. None at all.

By Mr. RYAN:

Q. You have exhibited a weekly statement, as I understood you?—No, sir; that is a monthly statement.
Q. Monthly statement of work done at Howard University, Rock eek, and Foundry Branch, showing credits on work that you were titled to pay for, and also showing the cash paid out on checks. Have u any similar statements for the year 1888?—A. No, sir; we didn't t any. One moment; I think I have; there was nothing coming to [Examining papers.]
Q. On this statement which you have exhibited to us, which is for e month of August, 1887, it appears that moneys were paid out for u on the check-roll, amounting in the aggregate to $5,879. Now, bee you had any settlement with Beckwith & Quackenbush, did you amine those check-rolls to see whether they were correct or not?—A. , sir; I did not.
Q. You settled simply on that sort of a statement, without any exination?—A. No; I think Mr. Emery used to look after that; I used t to be here, and he would leave when I would come here.
Q. In 1888 you were here, were you not?—A. Yes, sir.
Q. In your settlement with Beckwith & Quackenbush in 1888, did u examine the check-rolls?—A. No, sir; for the reason why, there as nothing coming to us and they paid me at the rate of $5 a day ile I was there, and then they made a statement. Here it is.

Q. They made a statement which showed that nothing wa you?—A. Ten per cent. was due, but Palmer and myself used to $30 a week, or $5 a day every day that we worked.

Q. How often did you settle with Beckwith & Quackenbu 1888?—A. We have had no settlement with them.

Q. None at all?—A. We settled for the work that was done pr to starting in with Palmer and myself this spring—settled for t work. They paid us for the old work that was finished up to ago last October, I think it was.

Q. Were you present at any of those settlements for 1887?—A. the statement that they gave me.

Q. That is all?—A. That is all.

Q. You never examined the check-roll at all?—A. No, sir Emery used to attend to that all the time.

Q. Did you examine the check-roll in 1888 at all?—A. No, did not.

Q. Personally, you do not know whether the check-rolls are or not, as paid by Beckwith & Quackenbush for you, only as the it in this general way?—A. That is it exactly.

Q. Was that because you were willing to settle in this way, it because your partner examined these check-rolls to see whethe were correct or not?—A. I was willing to settle that way. I ha ways found them to be honest since I have had anything to d them. I have known the firm for the last thirteen years, and the a very good name throughout the country.

Q. Then if there were a John Smith, or a John Night, or a Luke, or a John Wood, or all of them on the check-rolls, and n persons were employed at all, that would be a fraud upon you, w not?—A. I think it would.

Q. It would be a fraud perpetrated by Beckwith & Quackenbu A. Yes, sir.

Q. Unless those were fictitious names representing somethin you ought to pay for?—A. I should think it would be.

Q. You have no knowledge, then, yourself, personally, that an was carried on the pay-roll and the amount paid to that nam charged against you where the name was fictitious?—A. No, not.

Q. You never heard, then, that the name of John Smith, as car the pay-roll, was fictitious?—A. No, sir; I have not.

Q. You have never heard that the name of John Luke, as car the pay-roll, was fictitious?—A. No, sir.

Q. Up to this time you have no information on that subject at A. No, sir.

Q. And this is the first intimation you ever had of it?—A. Yes

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TESTIMONY OF JACOB H. DEWEES.

WEDNESDAY, *December* 19,

JACOB H. DEWEES, sworn and examined.

By Mr. CLEMENTS:

Q. Where is your residence?—A. At present it is Washington inally it was in Philadelphia, Pa.

Q. How long since you moved to Washington?—A. I hav away, off and on, doing work, but then for the last six years I ha sidered this my home to come to when not at work anywhere el

Q. What is your age?—A. Fifty-seven the 5th of this month.
Q. What is your occupation?—A. Contractor.
Q. Contractor for what kind of work?—A. Railroads, bridges, sewers, culverts; general contractor.
Q. How long has that been your business?—A. Since I came home om the Army; I think I took the first contract after the war on the h of October or 5th of November, 1865; I came home in August.
Q. Please name some of the principal contracts you have had.—A. he first contract that I received after the war was for the Lehigh Coal nd Navigation Company, or the Lehigh and Susquehanna Company, Lehigh, above Mauch Chunk. There I had a 64-foot rock cut. That st about $65,000 for the grading and masonry. In that same year, I ink it was, I took a contract for building 14 miles of the Pennsylvania ailroad on the Allegheny River and finished that contract some time uring 1866. In 1867 I had a contract for the Union and Titusville ailroad to build some 24 miles from Titusville to near Corry, a junction the Erie road; and in 1867, also, I was connected with the tunnel r the Union Railroad of Baltimore, of which W. W. Taylor, Bayard aylor's brother, was the engineer, and I was a member of the firm of ewees & Clark that had that contract. Baltimore City had subscribed 100,000 for that work, and the tunnel was to go under Green Mount emetery. Mr. Barnes, register of Baltimore City, failed to countersign register the bonds and the work had to be thrown up, but they paid r all the work that was done. And after that the Northern Central ailroad Company took it and built another tunnel under Baltimore.
Q. You did not state what the cost of that other contract was.
The WITNESS. The Titusville contract?
Mr. CLEMENTS. Yes. Do you remember what that was? You need t be accurate about it.
The WITNESS. It was about $150,000.
Q. And then the cost of this Baltimore contract?—A. That would ve cost $1,000,000; more than that. I think it was estimated that would have to be about 10 miles of road and would cost about $40,000 the mile, and the tunnel we had by the yard; so the tunnel would obably have cost about $800,000 or $900,000. In 1869 I was engaged do some work under Mr. Latrobe at the Sam Patch tunnel on sections 118 and 119 of the Pittsburgh and Connellsville Railroad.

By the CHAIRMAN:

Q. Was that under the Baltimore and Ohio Railroad Company?—A. o, sir; it was the Pittsburgh and Connellsville, but that was under the altimore and Ohio really. I suppose that contract cost in the neighborood of a couple of hundred thousand dollars, but there was some difficulty about the work and afterwards there were two or three contracts. owever, I was settled with and quit the work, and another man finished it for the company afterwards.

By Mr. CLEMENTS:

Q. Were you the principal contractor in that, or did you have a rtner?—A. Dewees & Clark was the name of the firm. In 1870 I ilt what was called the house of correction and poor-house for Vengo County, Pa., a building 141 by 200, and cost $140,000, or I gave nds for the work to that amount; Dewees & Simmons was the title the firm that had that contract; that was in 1870 and 1871. In 1872 had the Union and Titusville Railroad to build, and built that to point called Cashup in the oil region. That was about 24 miles. I ilt 9 miles of road, thirty-one culverts, and nine bridges; then the

company failed, owing me about $70,000, which they owe me yet. T
road was built under the auspices of the Atlantic and Great West
and they got into difficulty and sold the road; the first mortgage
for about $30,000,000 and it brought about $32,000,000; that wa
1872 and 1873. In 1875 I took the Pithole Valley Railroad and finis
that to Sharon, Pa.; that road cost, I suppose, about $30,000 a mil
had everything to do with that, the iron and everything, and kept
railroad in repair for some time after completion at the rate of $1
a mile. In 1876 and 1877 I had the superintendency, for the Penn
vania Railroad Company, for building a branch road from Hopewel
to where Harriet Lane lives, or Mrs. Johnson I think her name
then, to some coal mines that she owned; that was nominally for
Broad Top Company, but was really for the Pennsylvania Rail
Company; I superintended the building of the bridges and the grad
In 1877 I took the bottom out of the tunnel at Pittsburgh between
Perry and Brenton, for the Pennsylvania Railroad, and built them s
extra tracks and ballasted them, the work amounting to about $50
or $60,000. In 1878 I had a contract for grading Reservoir avenue
laying the water mains for the Pittsburgh water-works from High
Reservoir to the pumping station.

Q. What was that contract? What did it amount to in money?—
About $50,000; probably the trestle-work and all other work in
nection with it amounted to about $70,000; we tunneled under
finery there.

Q. Were you employed by the Pittsburgh city authorities to do
work?—A. Yes, sir; I had a contract under the water company of P
burgh; the water company there lets the contracts. There are twe
three members of the water company. In 1883 I superintended
work for the Government at Hot Springs, Ark.; the building of
sewer there. This tunnel work here was bid on in 1883, but that
was previous to this tunnel work here.

Q. Under whom were you employed to do that work at Hot Spring
A. Under the contractor, George Bardwell; his bid was $8,000 l
than mine. I might say, in the first place, the contract was awa
once before, and then I was next to the lowest bidder and the par
whom it was awarded threw it up, and then I was sent for by Secre
Teller, of the Interior Department, and was awarded the cont
Then it was found that the party who had been given the contra
the first place had made out his bonds, and after that it had to b
advertised. So Mr. McCammon, the solicitor up there, he was loo
out for my interests, being a friend of mine, and he said it would
to be re-advertised, and when it was re-advertised Bardwell go
although I was only $8,000 higher than he was in my bid. Th
superintended for Bardwell after he got it.

Q. What was the expenditure on that work?—A. I don't kno
didn't stay there until the finishing of it, but it was a 20-foot ope
and it was 2,700 feet long. I think it cost between $200,000 and $
000; I think I was at the Interior Department and there learned
it cost. Since that time I have had no contracts; I have bid on se
here; I bid on the grand stairway here at the Capitol with Mu
and Kirby and we filed our bonds for $500,000 each, and I indiv
ally bid on the Library here and offered $200,000 in bonds myself
bondsmen being Mr. Windsor and Mr. Kirby), for the concreting,
was $20,000 higher than the other party; then I have superinte
the building of some sewers here in the District.

Q. You say you offered $200,000 in bonds; you mean bonds as security?—A. Yes, sir.

Q. What kind of bonds?—A. For the faithful performance of the contract.

Q. You mean bonds with security?—A. Yes, sir; after the contract was awarded. Perhaps you have heard about how it was; the difficulty was that Mr. Smithmeyer was determined that Barnes shouldn't have the contract. They sent me a couple of letters asking me to modify my bid; I had bid in the lump by the yard. I modified my bid, so that I came next to him, but still I was $20,000 higher than he was, and I couldn't make it any lower, so consequently it was awarded to the lowest bidder. Since that time I have been at different places in the West and here, and worked under the District, and I superintended work for contractors in building sewers, etc.

Q. State whether or not you or your company bid for the contract to construct the Washington Aqueduct tunnel?—A. We did.

Q. Of whom was the firm composed at that time?—A. The firm at that time was composed of myself, A. G. Brummall, and Reese Evans, the last one being the same man who is doing the stone-work for the grand stairway here at the Capitol; he has a stone-yard right over here by the Capitol; it was the 5th of October when the bids went in. Four days afterwards, on the 9th of October, I received this note from Major Lydecker's chief clerk:

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., October 9, 1883.

SIR: Will you please call at this office to-morrow (Wednesday) at 11 a. m., to see Major Lydecker?

Very respectfully,

SIMON NEWTON,
Chief Clerk.

Mr. J. H. DEWEES,
1701 *Boundary street, Washington, D. C.*

Q. State whether or not you called in pursuance of that note.—A. I did.

Q. State what occurred, what was said.—A. Captain Hoxie and Major Lydecker tried to argue with me that I couldn't do the work at the figures.

Q. At your bid?—A. At my bid. I had heard, and it seemed to run in my mind, that Captain Hoxie wanted Major Cranford to have the contract, and that Major Lydecker wanted Beckwith & Quackenbush to have it. That was the general talk out among contractors.

Q. State how that impression was made on your mind.—A. The prices that Hoxie spoke of in reference to doing this work were Cranford's prices.

Q. Was he a bidder at that time?—A. Cranford was a bidder, yes.

Q. Did they try to get you to withdraw your bid or to modify it?—A. They didn't ask me to modify it. They didn't give me any satisfaction that way at all. I told them I was the lowest bidder, and I demanded to know what the bonds were, for I was ready to furnish them. They asked me if I had a plant on hand. I told them what was necessary, a $50,000 plant. They asked me if I had such a plant on hand; I told them no, and I told them that there were none of the contractors that were making bids for the work that had any plant there; I told them that I had all the tools that were necessary, the same as the others. I said no contractor would have a plant with boilers and engines and all that, because in a work of this kind he would want to buy new ones;

that no contractor for that kind of business would have a plant of th kind unless he come from some other place where he had been doi exactly the same kind of work and for which he had a lot of boilers a engines; but even then he would want new ones to work with whe the work was going to last three or four years.

Q. What did they say to you in relation to the requirements?— They said that I would be notified hereafter; that the amount of t bond had not been arranged yet. The truth of the matter was th Hoxie stated most, for Major Lydecker was not in a condition to st anything.

Q. Why?—A. I judge he had been on a fearful drunk the night fore, and he didn't get there until 12 o'clock that day, and he tremb so that he could scarcely write or anything. Captain Hoxie was t chief spokesman in reference to matters of that kind. They asked questions in regard to what air pressure it would take, how many toc and all such things. I told them I didn't think that was in my bu ness; that that was for the engineers. But I told them that if I ha little time I would figure it out for them.

Q. In relation to the question of plant did you tell them that y could get a plant or had arranged to get a plant from some firm house at Chicago?—A. No, sir.

Q. Did you state to Major Lydecker and Captain Hoxie on that oc sion, or any other occasion, when you had an interview with the while the bids were pending and before the contract was awarded, th you had arranged to get or could get from a firm in Chicago the n essary plant for this work?—A. No, sir.

Q. You never named the name of the firm.—A. No, sir; I can st what I did tell them.

Q. Just state that.—A. He asked me about having this plant; I t him no, I hadn't, but I could produce parties that had $50,000 to p chase a plant; and Mr. Beckwith had spoken to me about some elect lights and some railroad iron that he had; that is, Mr. Beckwith, the firm of Beckwith & Quackenbush, that got the contract; that w the day of the opening of the bids, after the bids were opened. Beckwith was present for the firm of Beckwith & Quackenbush, a they all concluded that I was going to get the contract as I had the lo est bid. If I said anything about any Chicago party it was Euge Robinson & Co., whose bid was lower than what Beckwith & Quack bush's was; Robinson & Co. were from Detroit, and they had don little work at the water-works of Chicago. But there was nothi spoken about a plant. I never saw Eugene Robinson, that is, to kn him; possibly he or his agent was present when the bids were open

Q. You said a moment ago that some railroad iron and some elect lights were spoken of; what about that?—A. Mr. Beckwith spoke me, that he had some on hand.

Q. What had they to do with this work?—A. That is what I spo to Major Lydecker and Captain Hoxie. After I saw the bids were of them open, and knew that I was the lowest bidder, I supposed th I was going to get the contract, and all of them who were prese outside of Beckwith & Quackenbush, thought so, and Mr. Beckw was introduced to me by some one—I never knew him before—and said he had some electric lights and some railroad iron, and if I need them he would be happy to sell them to me.

Q. Did you tell Major Lydecker or Captain Hoxie, or both, at a time before this contract was awarded that you could get a plant fr Beckwith & Quackenbush?—A. No, sir; only what I have told y

at is all the plant they had. It was said here that Captain Hoxie nt off to buy this plant for them; anyhow, he went off after the con- ct was let with them to New York, and the boilers and such things ne afterwards.

Q. You say it was said that he went with them to buy the plant for m? Who said so? Do you remember?—A. My impression is that got into the papers somehow that he had gone off with the contract- to see in reference to it; that is my impression now. I am not itive of that, but I think that is so; it was generally talked of among contractors here that he had gone off for that purpose. They didn't ve any plant except some iron and stuff, because everything that ne here they had purchased after that, and every other contractor uld have had to do the same. There was nothing said about my being informal or anything of the kind, not a breath of that in that eting. That is the only interview I had with them.

Q. Had you any notice from them at any time that your bid was ormal?—A. Nothing in the world, except a letter from the Secretary War in answer to a letter I had written to him. Major Lydecker ver answered anything. That was the reason I wrote a letter to the cretary of War, notifying him that I was ready to perform my part it. I had no reason to think that I would not get the contract, for bids were opened and my name was published as being the lowest der; it was published in the Sanitary Engineer, with the names of the other bidders. Here is the paper that had that article in it oducing a copy of the Sanitary Engineer]

Q. You say that Beckwith was present when the bids were opened?—Yes, sir.

Q. Were you present?—A. Yes, sir.

Q. Was Eugene Robinson present?—A. That I don't know; Robin- or an agent of his might have been present.

Q. So all the bidders were present or represented when the bids were ned?—A. I think so. They had the liberty to be; it was public. ere were three kinds of bids opened at the same time—for the reser- , the dam, and the tunnel—all on the same day, and I was the lowest he dam until about the time we were leaving the room, when there a new bid found afterwards, and we were called back and told there another bid found.

Q. What dam was that?—A. The dam at Great Falls. The dam was e raised and put across the river for the increase of the water sup- The bids were opened on the same day for that and the reservoir, well as for the tunnel, though they were three separate bids.

Q. And you say you were the lowest bidder for that when the bids were ned?—A. Yes, sir; and we were called back. They said another had been found on the floor.

Q. How long afterwards were you called back?—A. We were just ng out of the room; not over five minutes. This bid was said to e been found on the floor.

Q. Whose was that bid?—A. Chittenden Bros.

Q. Was the contract awarded to them?—A. It was; that bid was ut $6,000 less than any of the rest of us at that time. Everybody thought that I was the lowest bidder. One of that firm of Chitten- Bros. was a son-in-law of Mr. Delano's, deputy comptroller, that ited the engineers' accounts. It got too far down for me. That le me suspicious of these other things, and I got very suspicious.

Q. I understand you to say that your attention was never called to informality in regard to your bonds?—A. Never.

Q. Or to any defects in those bonds in any way?—A. Never until Secretary of War wrote to me in answer to a letter I had writte him. A few days after this interview I addressed Major Lydecker a ter stating to him that I was ready, so as to make it official.

Q. That you were ready to do what?—A. To give my bonds; I tified him that day verbally, but I hadn't done it in writing, to ha copy of it.

Q. And it was in response to that that you received a letter from Secretary of War?—A. No, sir.

Q. You addressed a letter to the Secretary of War in additio that, did you?—A. Yes, sir; I addressed first a letter to Major decker, then further to General Wright, the Chief of Engineers, and another one to the Secretary of War; I followed it up with letters

Q. You wrote to all of them?—A. I wrote to all of them.

Q. And you never had any intimation that there was any objec to your bond, or on account of any defect or insufficiency in it or bid, until you received a letter from the Secretary of War, Mr coln?—A. Not until I received a letter from Secretary Lincoln, wh have. This is the first letter I wrote to Major Lydecker. I had a tleman deliver all these letters for me. That is what that foot-not the bottom of that letter means.

DEPARTMENT OF THE INTERIOR, PENSION OFFICE,
Washington, D. C., October 19, 18

SIR: Having reason to believe that we are the lowest bidders upon the bulk o work upon the Washington aqueduct, we respectfully notify you that we are pared to furnish all necessary bonds and money, as per our bids and specificat which you in your wisdom may require.

Very respectfully,

J. H. DEWEES & CO.,
1701 *Boundary Street, Washington, D.*

Maj. G. J. LYDECKER,
Engineer in Chief, Washington, D. C.

(Papers furnished Major Lydecker by Maj. L. E. Johnson, October 19, 1883.)

OCTOBER

The Honorable SECRETARY OF WAR:

SIR: We are bidders for work on the new water-supply works of Washington, I to the amount of $464,800.00. We made this bid in response to a public adve ment, and we have a right to assume that the object of the advertisement was cure the lowest responsible bid. Our bid, as we are informed and believe, is $83,2 lower than that of Beckwith and Quackenbush, of N. Y., and $76,093.00 less than of Eugene Robinson, of Detroit, Mich. We learned some days since by the p newspapers, and yesterday by information orally communicated to our asso Maj. Louis E. Johnson, by General H. G. Wright, Chief of Engineers of the U. S. A that the contract is about to awarded to Beckwith and Quackenbush at their $83,200.00 higher than ours. Against this we protest. It is neither just to us n the Government. It favors private parties at the public expense, and for no re

We are responsible bidders, and are prepared to convince any one of that fact is willing to see the lowest responsible bidder prevail. We shall not rest unde imputation of having made a bid we could not execute, and shall not forego profits we are entitled to make by the proposed work without a vigorous pr wherever the same can be heard. With the highest respect for you, we ventu remind you that you are responsible for any acts of your subordinates, and tha engineer department of the District government is in this matter under your co We ask you to stay the award of the contract to any bidder higher than ours and assure you that our bond will be ready to secure the performance of the co to which we are entitled. We will add that neither Major Lydecker nor Lieute Hoxie have any right to favor other parties on the pretense that, as profess experts, they believe we can not profitably do the work under our bid. That affair. We have a right to the contract, whether we make or lose by it, if we you satisfactory security.

Appealing to your sense of justice and to your official obligation to see that the vernment is served in preference to private persons,

We are, most respectfully, your obedient servants,

J. H. DEWEES & Co.,
1701 *Boundary Street, Washington, D. C.*

Papers furnished Secretary of War by Maj. Louis E. Johnson through General H. Wright, Chief Engineer U. S. Army.)

Q. The letter from you to Major Lydecker you say you never re-ived any reply to?—A. Never; nor to the letter to General Wright.

Q. Have you that letter?—A. No, sir; I can not find that letter. But ajor Johnson delivered that letter; that is, Maj. Louis E. Johnson, a n of Hon. Reverdy Johnson, who was a United States Senator and ttorney-General. General Wright said then, so I was told, that he ld Major Lydecker that he was taking a fearful responsibility in commending a party for a contract at a higher bid.

Q, To whom did he say that?—A. To Louis E. Johnson, the one that livered that letter, and after the bidding we took Mr. Johnson into e firm.

Q. What firm?—A. My firm. I gave him a paper for a certain con-leration stating that he was taken in as a member. He had a brother-law, William R. Travis, in New York, who was worth two or three illion dollars. You see I was afraid that they were going to put up excessive bond on me, and we had Mr. Johnson taken in for that rpose.

Q. At the time Mr. Johnson delivered those letters for you in what pacity was he acting for you?—A. He was acting as a friend to me. art of these letters were delivered first, and I think it was some time out the first of November, or maybe a little after that, that he was ken into the firm; I gave him a paper; I forget the date of that per.

Q. You say that Maj. Louis E. Johnson was taken into your firm?—. Yes, sir; for valuable considerations. I didn't state what the con-derations were, but that is what they were. This Major Johnson was arshal of South Carolina under Grant's administration; he had been wn there planting cotton at that time.

Q. What is his business?—A. At this time he is agent for the Torcine raided Wire and Mattress Company.

Q. Where does he reside now?—A. At 1006 F street, Washington. e delivered all these letters in person, including this letter to Secre-ry Lincoln.

Q. What letter?—A. One of these two that I have shown you this orning. That was when Secretary Lincoln told him he thought the g had got through the fence. Mr. Johnson told him he thought he d better reach through and take hold of the tail of the dog and drag e dog back.

Q. What did he mean by that; that the contract had been awarded?—. Yes, sir; that it was too late to talk about it. I may as well state ont Major Lydecker's father, I suppose.

Q. Yes, go on and state that.—A. Major Lydecker's father had been er here on some occasions, and some parties told me—I don't know ho it was now, but it was common report—that he was working for eckwith & Quackenbush. He had been here two or three times, and e morning I went up to Willard's about 8 or 9 o'clock in the morning, d I found that Major Lydecker's father and some other New York liticians, Wheeler, French, and some others, were here, and I sent ajor Johnson to follow those men to see where they went. He found

that they went to the White House, and the next day the contract awarded.

Q. That was after these letters to the Secretary of War?—A. sir; Mr. Peterson, who was a partner in the contract with Beckw told me a few days afterwards that they were going to get the cont anyhow; that they had that all fixed. Peterson is now a partner Beckwith in the New York aqueduct, and at that time he was on the partners in building the reservoir here.

Q. When did he tell you?—A. A few days after this 9th of Octo some time in October, only a few days afterwards; I could not tell actly, because we had a great many conversations about those thi

Q. It was between the opening of the bids and the time the cont was let?—A. Yes, sir; a very short time after the opening of the

Q. Peterson told you that?—A. Yes, sir.

Q. What else did he say? Did he say why he thought so?- Well, I don't recollect. I think he said that they had friends in York that would get the contract for them; I am pretty sure he I think I told him that old man Lydecker and some others were here; I think I have told Mr. Peterson that several times, that I thou that Lydecker was a partner.

Q. Do you say that Major Lydecker's father was here several ti while the matter was pending?—A. Yes, sir. Well, I know one o time. I saw by the papers that Lydecker, formerly of the New custom-house, under President Arthur, had been here; and this ti looked at the hotel register myself, and I sent Johnson to follow t to see where they should go. I supposed there was something of kind going on, and that is the reason I wrote those letters so expl rather severe for a citizen to write to the Secretary of War and G eral Wright and those parties.

Q. Was Peterson here during that time, between the time the were opened and the time the contract was awarded?—A. Yes, before it was made public.

Q. Was Beckwith here several times in that time?—A. Yes, sir.

Q. Do you know whether Quackenbush was here during that time A. I think he was not here until Beckwith came the second time think Beckwith was here three or four days, and then went away, before he went away he said he was going to get the contract.

Q. Who said so?—A. Beckwith.

Q. To whom did he say so?—A. He said that to me; that he thou they were going to get it.

Q. Did he say why he thought they would get it?—A. He did Of course he wouldn't tell me that.

Q. Do you remember what names were on the bonds that you dered at that time?

The WITNESS. When the bids went in?

Mr. CLEMENTS. Yes.

The WITNESS. Dale and Green. Dale was my father-in-law. has been on my bond for $70,000 or $80,000 at a time.

Q. And Green?—A. Green was at one time at the Smithson He is an electrical man.

Q. What place did he hold at the Smithsonian?—A. Electrician. has been to Europe; I think he is in Europe now; I don't know whe he has got back or not. He has been to Europe or somewhere in re ence to something of the kind. He is an heir to considerable prop here, he and his sister; they are heirs to property that belonged their father.

Q. What, in your judgment, was he worth at that time?—A. $30,000 $40,000.
Q. What was Mr. Dale worth, in your judgment, at that time?—A. uppose $100,000.
Q. Where does he live?—A. He lives at Tionesta, Forest County, . There never was any question about anything of that kind; until t letter was sent they never raised any question about any informal- at all. There were several parties I had communications with in erence to bonds and money; one of them was president of a bank e in Washington. But they wouldn't tell us what bonds we had to e, and so we didn't know where he had to go or how much we had raise. That was the reason of having Travis in the business.
Q. What did you have him for?—A. We wanted him for a bonds- n, because we feared the bonds would be put up on us excessively gh. Mr. Travis died about a year ago, and he was worth at that e about $3,000,000: he was a brother-in-law of Major Johnson, and on-in-law of Hon. Reverdy Johnson. Major Johnson was taken in fear of them putting up the bonds on us, and we wanted Mr. Travis go on our bond if necessary.
Q. Had he agreed to do so?—A. I understood so from Mr. Johnson. told Johnson on several other occasions that at any time anything ld be got in the contract line he would go on his bond. Of course I ouldn't have taken Johnson into the firm without some reason for it.
Q. What was Mr. Travis worth?—A. The papers say he was worth ee millions and a half at the time he died. He died about a year ago. at is a good time to tell what a man is worth, when he dies.
Q. What were the members of your firm worth at that time?—A. I n't know, as far as that is concerned.
Q. Give your best judgment about it.—A. I suppose they were worth out $100,000. I think I told Major Lydecker that. I think that is out what I told him. I told him also that I could bring a party there indorse $50,000 worth of plant. That is when he asked me the ques- n whether I had a plant on hand, and I told him no. He asked me I had a plant on hand (that is, boilers and engines), and I told him but I had a party that would indorse me for $50,000 of plant, and plant would cost that much.

By Mr. FAULKNER:

Q. Where was that party? Did you refer him to the party?—A. No, ; I never had a chance to. They never would submit the bond or thing of the kind, or give me any satisfaction.
Q. Did you not refer him to a party in Chicago?—A. No, sir.
Q. As to your responsibility?—A. No, sir.
Q. A party to meet the terms of your contract?—A. No, sir.

By Mr. CLEMENTS:

Q. To whom did you have reference when you said you would fur- h a man who would indorse $50,000 for plant?—A. I had had a con- tation with Matthew B. Emery, president of a national bank on enth street.
Q. Had he agreed to do so?—A. He told me to call upon him again. had had an interview. Mr. Kerr and Sam Strong had taken me there introduced me, and we talked about making some arrangement h Mr. Emery. But I couldn't tell anything in reference to what I had do. He was willing to go on bonds provided I done certain things; y were to handle the money until that $50,000 was paid. We hadn't ned papers to that effect, because I had only been in negotiation and

nothing was concluded in reference to it. Major Lydecker never a me for any reference to anybody. As I said before, he wasn t in a dition that day to ask anybody anything. It was a very difficult ter for any contractors, except just a few, to get specifications; things had all gotten into a little ring and it was the most difficult in the world to get specifications; they refused me specifications a time.

Q. Who did?—A. Hoxie.

Q. That was when you were wanting to submit a bid?—A. A time we were examining the work previous to the letting. Of co when a man expects to make a bid on the work he wants to exa the work and he wants to examine the specifications.

Q. You mean before you bid?—A. Oh, yes; he wants to see the ifications and examine the work ten days or two weeks before the made. There were several contractors here in Washington who refused.

Q. What reason did he assign for not allowing you to have the fications?—A. The reason was that they wanted to have a pla $50,000 on hand, which no contractor had that bid on the work.

Q. At that time did he insist that you ought to have a plant? He said it was necessary that a contractor should have a plant. didn't say that to me, but I have heard several parties that d there and couldn't get their specifications.

Q. What reason did he assign to you in reference to the refu give you the specifications?—A. He told me to call again.

Q. Did you call again?—A. I did, with Colonel Christy, a la here, and got my specifications without any trouble. But se parties told me at the time that they couldn't get specifications.

By Mr. FAULKNER:

Q. Who were those parties?—A. A party by the name of De was a contractor, and he was one; and I have forgotten who the o were, but it was common talk among contractors. I think there only six bids altogether. I have all the bids here.

By Mr. CLEMENTS:

Q. You said a few moments ago that General Wright said to Lydecker that he was taking a fearful responsibility to recommen awarding of this contract to any other than the lowest bidder? Yes, sir.

Q. To whom did he say that?—A. To the party that served m ters on him, Major Johnson. Major Johnson will testify to that i call him.

Q. Did General Wright say that to Major Lydecker or to Mr. son?—A. General Wright, the Chief of Engineers at that time, s Major Johnson, the one that gave this letter to him protesting ag letting the contract. General Wright said that he had told Majo decker that he was taking a fearful responsibility in recommend higher bidder to have the contract.

Q. Did you have any interview with General Wright about it? I did not.

Q. I believe you stated that you got no reply from General W to your letter to him?—A. I did not, nor from Lydecker; but I reply from the Secretary of War.

Q. Have you that reply?—A. Yes, sir; I have a reply from the retary of War on the 27th of October, and also on the 2d of Nove 1887.

The witness submitted the letters to the committee; they were ordered to be embodied in the evidence, and are as follows:

WAR DEPARTMENT,
Washington City, October 27, 1883.

GENTLEMEN: The Department is in receipt of your letter of the 22d instant in which you assert the claim that you were the lowest bidders for the work of tunnel nstruction for increasing the water supply of Washington, D. C., the contract for hich you understand has been awarded to Messrs. Beckwith & Quackenbush, of ohawk, N. Y., and request that the subject of the award of such contract be reonsidered, and that you be furnished with certain specified information in regard ereto.

In reply I beg to inform you that your bid for the work in question was rejected der the provisions of a clause in the advertisement for proposals by which the ght was reserved to reject any and all bids, and upon the recommendation of the gineer officer in charge of the work, concurred in by the Chief of Engineers.

Although the Secretary of War is under no obligation to explain to private indiduals the reasons which governed the rejection of bids, there is no objection to ting that among the reasons which governed the action of the Department in reting your bid in this case were the facts that your bond was fatally defective, and at you failed to comply in essential particulars with the instructions to bidders.

Very respectfully,

ROBERT T. LINCOLN,
Secretary of War.

Messrs. J. H. DEWEES & Co.,
1701 *Boundary street, Washington, D. C.*

WASHINGTON, D. C., *October* 29, 1883.

SIR: Having cause to think that the report of Maj. G. J. Lydecker, Engineer Commissioner of District of Columbia, as regards Col. J. H. Dewees's ability to carry to a ccessful termination his bid upon the tunnel of the Washington water-works is sed upon erroneous impressions, we hereby respectfully request a copy of Maj. G. Lydecker's report to your honorable self, for the purpose of answering the same in tail on all points, including the practical experience of Col. J. H. Dewees during e last twenty years upon the Pennsylvania Railroad and other important works. king for a suspension of judgment upon your part until we have had a full hearing eing, as we are, $83,200 below Messrs. Beckwith & Quackenbush, of New York, and 6,093 less than the bid of Eugene Robinson, Detroit, Mich.)

Very respectfully,

J. H. DEWEES & Co.,
1701 *Boundary Street, Washington, D. C.*

Hon. ROBERT T. LINCOLN,
Secretary of War.

WAR DEPARTMENT,
Washington City, November 2, 1883.

GENTLEMEN: I have the honor to acknowledge the receipt of your letter of the 30th imo, protesting against the award of a contract for work on the new water-supply rks of Washington, D. C., to Beckwith & Quackenbush, and claiming that the ntract should be awarded to you, for the reason that you were the lowest bidders, d to state in reply that I have re-examined the papers in the case and see no rea, either in them or in the statements contained in your communication, to change views which led me to approve the recommendation of Major Lydecker, the officer charge of the improvements, and General Wright, the Chief of Engineers.

Very respectfully,

ROBERT LINCOLN,
Secretary of War.

Messrs. J. H. DEWEES & Co.,
1701 *Boundary St., Washington, D. C.*

Q. Does any other fact pertinent to this investigation occur to you w which you have not stated before?—A. I think not. Mr. Louis Johnson can state what each one of these parties told him. Lydeckhe couldn't find and he left the letter with his chief clerk. The ma was scarcely ever to be found in his office. But to General Wright d the Secretary of War he delivered the letters personally. I knew

the ring I had to fight, and that was the reason I wanted some o deliver the letters personally to those parties.

Q. Did he have conversations or interviews with those men a time he delivered the letters?—A. He did, with the exception o decker.

Q. Does Mr. Johnson reside here?—A. Yes, sir; at 1006 F s There is one other thing I might mention. I thought of exposing thing as far back as 1886. Major Johnson can tell you more abo than I can. There was a committee appointed by the House; Ge Viele was chairman of that committee. He went to see General V but he was away somewhere on some business.

Q. Who went to see General Viele?—A. Johnson. I took the p and gave Major Johnson a copy of all of them and he took them to eral Viele, I think, and we supposed there was going to be an in gation then, but finally there was a whitewash of it. General V son was put on the New York Aqueduct and that was the end of

Q. Put on the New York Aqueduct in what connection?—A. engineer.

Q. What connection had that with these contractors?—A. I wa deavoring to have this investigation occur at that time, in 1886, found that I was beaten and I said nothing.

Q. You say that General Viele's son was put on the New York A duct?—A. Yes, sir; so the papers said.

Q. Was that the aqueduct that Beckwith & Quackenbush we work upon under a contract?—A. Yes, sir.

By Mr. FAULKNER:

Q. In whose employ was General Viele's son, the contractors' o city's?—A. I understood from the papers that it was the city.

Q. What influence would Beckwith & Quackenbush have had c city to have him in employment as a city engineer?—A. They had siderable influence with both parties in reference to the contract and I suppose they had the same in New York. They could reac White House under the Republican administration, and under the ent one they had the President's former law partner, Mr. Bisse their counsel. So they seemed to get pretty near the head every

By Mr. CLEMENTS:

Q. In relation to that, for what purpose did they have Mr. B employed; do you know?—A. I can't say; I can only suppose. opinion was that it was to prevent anything being done at the Wa partment.

Q. Do you know of anything that has been done here; any acts in connection with the matter?—A. I do not; only I know most of the engineer officers tried to smother the investigation all could. I have talked with several of them. They seem to think Major Lydecker is all right yet.

Q. You say they tried to smother this investigation; can you any facts?—A. No; only in talking; saying that it wouldn't amou anything. I have been thrown in contact a good bit with the neers.

Q. What officers of the Engineer Department do you refer to Now, I can't tell exactly; I have been introduced to several and been talking about it. I don't know as they were engineer office together.

Q. Anybody connected with the War Department, can you t

No; only just general talk. I have heard a great many talk. I introduced by Colonel Stewart to one of them, but I have forgotten name; he was on public works somewhere, but I don't know where; ink he is an engineer officer; at least Mr. Stewart told me he was; syth, I think, his name was; I am not positive. And I have also ed to Mallory, a retired Army officer, who was lieutenant-colonel of regiment previous to me; I succeeded him, and I have been very nate with him. And I saw a piece in the paper, signed by an en- er officer, stating that Lydecker would not be removed, and that it the duty of the Engineer Corps to stand by him. I saw a piece in Baltimore American at one time, written by some engineer officer, ne that was supposed to emanate from them.

By Mr. FAULKNER:

. What did any one of these officers say which led you to believe they were trying to smother this investigation?—A. The general of most all the Army officers was—and naval officers too—that e wouldn't be anything done, that they were honest and every- g of that kind.

. You do not know of any act of any of the officers that in any way ented or tended to prevent an investigation?—A. No; I never d any one talk that belongs to the military court of inquiry; I t know either one of those officers.

By Mr. CLEMENTS:

. If I understand you correctly, you refer just to opinions that have expressed?—A. That is all.

. And can not state any definite, specific acts that any of them have or anything that they have said tending to prevent an investiga- ?—A. I have heard Commodore Nicholson talk, who is, I think, a her of Major Nicholson, of the Marine Corps; I am acquainted with and I have heard them say that everything is honest with Ly- ker and Townsend, and that there wouldn't be anything; that it ld all be thrown on the inspectors; that is the general talk.

By Mr. FAULKNER:

. Has that been since the investigation has been going on?—A. t has been since the investigation has been going on by the court nquiry; yes.

. And since the publication of the affidavits, etc., in the papers?— Yes, sir. You can hear it talked any day when you are in military aval circles.

TESTIMONY OF NELSON J. DAVIS—Recalled.

WEDNESDAY, *December* 19, 1888.

ELSON J. DAVIS recalled and further examined.

Mr. R. Ross Perry, counsel for Beckwith & Quackenbush, was pres- during the examination of this witness by leave of the committee.)

By Mr. FAULKNER:

. You were requested to produce the books of the firm of Beckwith uackenbush to-day, that would show all the moneys that were paid to parties interested in the original contract; have you those books you?—A. Yes, sir.

. Are you able to state to the committee the amount of money paid

to the several parties interested in that original contract?—A. think I can. [Referring to book.] Mr. F. C. Shepard was one partners; he received $5,000; $5,000 was charged to him.

Q. That was the total amount?—A. Yes, sir.

Q. Can you state whether he was a partner in the original cont A. That I don't know; that is what has been paid to him since. know what the understanding was with the company.

Q. What date was that paid?—A. March 30, 1886, there was him $100.

Q. Did you give the date of the payment of the $5,000?—A. had three payments, making $5,000 in all. November 8, 1886, paid $300. January 28, 1888, he was paid $4,600, making alt just $5,000. Mr. H. C. Alexander was another partner. Novem 1887, Mr. Alexander was paid $25; November 16 of the same was paid $1,000; January 28, 1888, he was paid $3,975. That just $5,000 altogether. January 30, 1888, Charles Peterson w $3,000. Now, do you want Mr. Beckwith's account?

Mr. FAULKNER. Yes.

The WITNESS. Do you want all these items?

Q. What is the date of the first?—A. December 18, 1883.

Q. Just give the items.—A. Beckwith was paid $25 on th March 19, 1884, he was paid $10.

Q. There is no item between those two dates?—A. No, sir. 25, he was paid $10; March 31, he was paid $10.

Q. You can just aggregate the remainder of those entries, giving the dates of each.—A. I can call them off and give you th Here is one, on page 125, of $66.

Q. Have you no account between Beckwith and the firm that show the aggregate amount drawn by him?—A. No, sir; he ha running account.

Q. But does not the ledger show the aggregate amount paid to A. Oh, yes; the total footings would show that. This is his account. He has got his salary entered up here, and he owes a of $3,561.19, and some salary ought to be credited up to him.

Q. I do not care about going into private matters of that sor I want to know is the amount he has received.

Mr. PERRY. On account of this contract. Can you not sta from the books?

A. No; I don't know that until they make a final settlement.

Q. All I want to know is what he received; it does not ma difference how the account stands between the partners?—A. settled. He has had money to put into other work, and expens everything of that kind. When they settle he will have to h account settled.

Q. Then the books of the firm do not show how much money received on this contract?—A. No, sir.

Q. From the proceeds of this contract as paid by the Governm them, no matter what parties he received it for?—A. Beck Quackenbush, I think they have received——

Q. I mean Mr. Beckwith's individual account.—A. When the on here they furnished money and plant to start the work; Be & Quackenbush did. That was charged up to Beckwith, Qu bush & Co., and the account has never been settled. January 3 Beckwith & Quackenbush received $10,000.

Q. Is that the first item that Beckwith & Quackenbush, as received, and that is charged up on the books against them?—

ve an account here for plant and money charged to the company; at is for Beckwith & Quackenbush.

Q. That is a debit against the company?—A. Yes, sir.

Q. Is that $10,000 the only credit on the credit side of the firm for ckwith & Quackenbush?—A. It isn't credited up yet. That is what ckwith & Quackenbush have received on account. Then they have ner accounts, back and forth, for rent, checks, etc. Sometimes when heck would be given on private account it is credited up and paid; it a running account, but the difference is not much here now.

Q. Then, as I understand, they had a private account in addition to at firm account?—A. Yes, sir.

Q. Can you state how much has been paid to each one of the partners, appears on that private account, of funds that have been received om the Government under this contract, if any?—A. When the Gov- nment gives a check for the estimate it is deposited in bank, and they ake a check and get the money out for expenses, etc., and it is charged to their account. They both of them have a salary also.

Q. What is their yearly salary—do you know?—A. I will look. It $450 a month, I think. [After looking.] They have $450 a month.

Q. Then their private account would not show any payments other an $450 a month, unless it was for expense account?—A. No, sir.

Q. That $450 was simply the salary, and did not enter into the question profits of the firm at all?—A. No, sir.

Q. I believe you kept those books entirely, did you not?—A. Yes, sir.

Q. Do those books show any payments to any officers of the Govern- ent from October, 1883, up to the present time?

The WITNESS. To officers of the Government?

Q. To any employés of the Government by name?—A. No, sir; they not.

Q. You are satisfied of that?—A. I know that they do not. We have thing to do with paying the Government.

Q. Do you know whether those books show any payments to any me that may represent any agent of the Government connected with s tunnel?—A. No, sir.

Q. Or with the War Department, from 1883, up the present time?— No, sir; I don't recollect anything of that kind.

Q. Do you know of any payment to any one under a fictitious name?— No, sir; I don't.

Q. Do you know of any fictitious name or representative name ap- aring in those books, or anywhere, for any purpose?—A. No, sir; I n't.

Q. Do you know of any attorneys who were employed by Beckwith Quackenbush in 1883?—A. I do not. I could look at the accounts d see. They had plenty of law business around the country.

By Mr. CLEMENTS:

Q. Do these books show entries of amounts paid to Mr. Beckwith or . Quackenbush, or any individual member of this firm, for expenses?— Yes, sir; here is something carried to expense account, cash.

Q. Does it show what the expense was for—on what account?—A. , sir; it was paid to them; I don't know whether the money was ed in this work or by other parties. They were doing a great deal work, and sometimes they would have a check made and charged to expense account.

Q. It was paid out of the proceeds of this contract, was it?—A. Yes,

Q. Have you that expense account there, so that you can run ove
items?—A. Yes, sir. I shall have to pick these out as I go along.
Q. (After the witness had consumed some time in examinin
books.) I do not know whether you understand my question.
I wanted was the amount paid by Beckwith or Quackenbush, indi
ally, on account of the firm, and which was refunded to them.—A
first item is December 3 to 14, $84: Fare to New York and return,
hotel, Grand Union, $42; meals, Grand Union, $40.80; room,
House, $8; meals, $18.60.

Q. You need not give further the items. Have you anything
of that—of prior date?—A. That is the first one I can get.

Q. Is it footed up to show what the whole amount of it is?—A.
sir; the whole of it is $154.22.

Q. What are you looking for now; is it all subsequent to that
you have just mentioned?—A. Yes, sir; that is the commenceme
the expense account.

Q. You need not trouble yourself to follow that up, then.—A.
is another item for $60 (expenses from July 26, 1885, to July 29),
days, for trip to New York, etc.; $60 is the total amount.

Q. I do not care for that. Have you any account of the exp
paid to Mr. Beckwith for coming to Washington before this co
was awarded?—A. That is what I am looking to find.

Q. Well, if you can find it without taking too much time.—A
penses to New York, January 16, 1886, do you want that?

Q. No, I do not care for that. You need not put in any of
numerous items of expense unless you have them all aggregated
I don't find anything about this work.

Q. You need not spend further time on that.—A. There are a
many items.

Q. You spoke about the amount for the purchase of this plant.
you tell us what that was?—A. Yes, sir.

Q. Have you the items footed so that we can tell readily what
amounts to?—A. Yes, sir; I guess I can do that pretty quick. H
where Beckwith & Quackenbush were charged with cash, plant,
current account.

Q. How much did it aggregate?—A. The balance brought for
in one place is $74,796.29, and the balance brought forward ag
$63,193.27.

Q. What does that include?—A. It includes cash, plant, etc.,
they had on hand; engines, drills, and everything of that kind.

Q. That includes some cash, do you say?—A. Yes, sir.

Q. Can you tell us about what the plant cost?—A. $103,348.47
amount charged up to plant; but this was not all purchased by
with & Quackenbush; there were other accounts charged to pla
count; some for pipe; that was bought from R. D. Wood & Co.
also purchased some things from the Ingersoll Rock Drill Compa

Q. Does that amount cover the cost, without regard to whom i
bought from, so that it would show what was paid for the plant in
nection with the tunnel?—A. This is the amount paid and charg
to that account. Of course there are other items charged up in diff
accounts under different heads.

Q. Do your books show the account of Beckwith & Quackenbu
regard to their contract for building houses here in Washington?
you keep their books in connection with those matters?—A. Yes,

Q. I do not care to go into that further than to ask you wheth
not there was paid on any of those accounts for building houses h

ashington anything to anybody connected with the War Department in connection with the Government service in any way?—A. No, sir; that I know of. That was all in connection with real estate that y purchased on Thirtieth street in Georgetown.

Q. They built houses under contract for other people, did they not?—No, sir; not for other people.

Q. These were houses for themselves?—A. Yes, sir; the houses beged to Beckwith, Quackenbush & Co.; there were nine houses, and erything that belonged to them belonged to the firm of Beckwith, ackenbush & Co.

Q. You do not know of anybody in the employ of the Government any way, or representing the Government in any way, that was paid service or work in connection with the tunnel?—A. No, sir; I don't. e had nothing to do with the Government officers; they were paid the Government, I suppose.

Q. There was nobody connected with the Government in any way that s employed to do any work for the company, or to get up plans, or ything of the sort?—A. No.

Q. Have you the accounts balanced up so that you could tell us readthe entire amount that has been paid out by the firm of Beckwith, ackenbush & Co. on behalf of this tunnel work?—A. No; that would e some time. I can make you out one, though, if you wish.

Mr. CLEMENTS. We will confer about that. You need not do it unss we call upon you for it.

TESTIMONY OF CAPT. R. L. HOXIE.

THURSDAY, *December* 20, 1888.

Capt. R. L. HOXIE, sworn and examined.

By the CHAIRMAN:

Q. What is your age?—A. Forty-four.

Q. And your occupation is that of a member of the Corps of Enneers of the Army; we all know that?—A. Yes, sir.

Q. Were you at any time connected with the Washington water supy business?—A. Yes, sir.

Q. State when your connection began, either under the District or der the Corps of Engineers proper?—A. My connection commenced der the act of Congress of 1874 creating the commission government the District of Columbia.

Q. State what your connection was with that?—A. In this act it was ovided that an officer of the Engineer Corps of the Army should be tailed by the President, who should have control and charge of the rk of repair and improvement of streets, avenues, alleys, sewers, nds, and bridges, under the general direction of the Commissioners. nder that act I was detailed as such officer.

Q. Did that include charge of the water?—A. I was thinking of that I recited the law. It practically did, because the duty was assigned me by the Commissioners. I had practical charge of all engineering erations of the District at that time.

Q. You were at that time subject to the direction of the Commisners?—A. Yes, sir.

Q. And had the actual charge of the water-works?—A. Yes, sir.

Q. How long did you continue in actual charge of the water-works

under the direction of the Commissioners?—A. Until the cha
form of government, which was made in 1878, by the act of Co
under which the commission government was made permane
modified so as to include as one of the Commissioners an officer
Engineer Corps of the Army above the rank of captain. Under t
I was detailed, or simply remained, I do not remember now wh
was an additional detail or not, as assistant to the Engineer C
sioner, Major Twining.

Q. How long did you continue to be assistant to the Enginee
missioner?—A. Up to the 16th of August, 1884. Major Twinin
in the meanwhile, and his successor, Major Lydecker, continued
that position.

Q. During all that time, I understand you to say that you were
the direction of the Commissioners as your immediate superior
Until 1878 I was; that is to say, I was rather under the direction
Engineer Commissioner. The law provided that an officer sho
detailed to assist him in the special duties confided to his charge

Q. And you took your orders from him as Engineer Commissio
A. Yes, sir.

Q. And did not take your orders from the Chief of Engineers,
ing directly under the Engineer Corps?—A. No, sir; from the En
Commissioner.

Q. State your first knowledge and what you did in respect of
crease of the water supply, as it regards bringing water to or
neighborhood of the city from the present distributing reserv
beyond Georgetown.—A. The question was presented to me ver
during my connection with the District affairs. The demand
increase of elevation of the water supply, so as to supply the
portions of the city, was pretty loud and urgent almost from the
first came into District affairs. The consideration of the subj
myself began at that time, in 1874. The first official presentation
views which had the attention of Congress——

Q. I do not care anything about Congress now in this conn
Just give us the first official presentation of your views to you
rior, whether it was Major Twining or whoever.—A. It was
Twining. I do not recall, Senator, the first annual report in w
expressed any opinion upon that subject, but I think that thro
my annual reports, from 1874 to 1879, I had more or less to sa
the subject.

Q. Those are all in print?—A. Yes; those are all in print.

Q. Those we have. So, so far as their contents are concern
extended observations are necessery. Then I will ask you this:
was the first plan that you yourself resolved upon as being the
thing to recommend in regard to the water extension?—A. The
sion of the existing aqueduct substantially in the same way in
it had been constructed.

Q. In the same way that it came from the Great Falls to the
voir?—A. Yes; substantially.

Q. When did you or anybody else in authority, to your know
first depart from the original plan and make a change?

The WITNESS. When did we first consider such departure?

The CHAIRMAN. When did you consider such departure, and
led you to do so, stating it as briefly as you can, because I sup
the main it all appears in print?

The WITNESS. Largely, yes. In the whole matter Major T
and myself, of course, worked together; I under his direction.

senting this plan for the continuation of the Washington Aqueduct, stantially in accordance with the method in which it had been con-ıcted, we debated between ourselves, while the matter was still pend- in Congress, and one special feature in that, which was an exception he general method of construction, was the scheme which we thought desirable for crossing the deep valley of Rock Creek; that was a p-rock tunnel, or force conduit under pressure. That was intended the original plan of ours to be the means of meeting the local and gle obstacle in the path of the conduit. We got the idea, I think, n the Chesboro system, which has been introduced upon the lakes the water supply of Chicago, and perhaps other cities. It is now ut thirty years old and is in successful operation.

. Why did you consider the tunnel plan of crossing the valley of k Creek preferable to carrying the water through a flowing conduit r a bridge?—A. The practicability of making this special construc- depended absolutely upon this condition, whether the borings in this k were satisfactory. That is to say, we had before us the experience hicago, where a surface conduit, so called (that is to say, a conduit not ler pressure), was found to be impracticable, or at least undesirable. get the water from the lake for Chicago they could have made a large pipe or main in the bottom of the lake, which would have been ıething in the nature of a surface conduit. The plan of Mr. Chesboro, ever, contemplated going down into the earth to find a suitable ma- al through which he could tunnel out to the point where he wanted get the water. The original and first scheme of this kind depended upon the finding of a suitable material at a reasonable depth below surface of the ground in which to drive economically a tunnel for purpose. That was the basis of our proposition for crossing Rock ek by a similar method if the borings in this rock should be satis-tory.

. In the opinion of yourself, at that time, and that of Major Twin-, if he concurred with you, as I understand from what you say he , what made that thing (the assumption of suitable rock at a suita- distance below the surface) preferable to carrying the water by a ving conduit across a bridge in order to cross that valley?—A. Its th in the earth gave it greater immunity from depredation and from lution of the water; in other words, greater security from malicious ion or trespass; it had also, we considered, the additional advantage greater cheapness.

. Do you know how much the difference was computed by you to be ween a tunnel, constructed under the conditions you have described suming those to have been possible), and the building of an iron dge?—A. I do not recall that now, Senator, because it has been a d many years since it transpired, and unfortunately I have no mem-ndum of it.

. Are there not in the district office, or were there not when you , papers, computations and drawings, going to show a comparison ween a bridge and a tunnel?—A. I think there were; such drawings l computations were made at that time.

. They were not purposely destroyed, of course?—A. Oh, no.

. And if they were made at that time you did not carry them away en you left?—A. No, sir.

. Then they ought to be there?—A. I think they ought to be there ong the records.

. Your plan contemplated going under Rock Creek and rising again the other side to the original flowing plan, I suppose?—A. Yes.

Q. You found that a tunnel made under the conditions named be cheaper in construction than the method of carrying the water kind of a bridge that would be suitable?—A. Yes; as I estima and I can give you the cost as I remember it. The cost was sim cost of excavation of the rock, because it was assumed that unle rock was of such a character as to require no lining it would not b able for that project. We estimated that the excavation of th would be about 3 cubic yards to the running foot, which, at $8 pe yard, would be $24 a linear foot. In other words, we computed th cost of crossing Rock Creek per linear foot for that length would ceed the average cost of every other part of the lining. Indeed th mates, I think, will show that, because that was assumed.

Q. Having concluded, therefore, that the best way of crossing Creek was under the conditions you have described—the tunn scending by a shaft on one side, and carrying the water horiz across to and rising on the other side by a perpendicular shaft provided the rock was found to be suitable—what did you do in to finding out whether the rock was suitable?—A. Nothing time, because we had no funds that were available for the explo of that rock.

Q. When did you first undertake to ascertain, when funds we vided for going on with the work, what was the character of th there at Rock Creek?—A. It never was attempted properly to asc the nature of the underlying rock; it never has been.

Q. Did you in your time undertake at all to ascertain that?—A I did not.

Q. Why did you not?

The WITNESS. What time do you refer to, Senator?

Q. I mean your plan of getting across Rock Creek Valley with nel such as you have described, your plan being based upon the tial condition, as I understand you to mean, that the rock was to a solid and capable character in suitable proximity to the surface. did you not proceed, as soon as you had any appropriation that be available for that purpose, to make the borings at that place in to ascertain what the nature of the rock really was?—A. Ther compelled to go into the possible or probable motives of Major Lyd because the work was then under his charge.

Q. I mean before Major Lydecker came in and while you were as assistant to Major Twining.—A. There were no funds availab

Q. What date was it when the work was turned over to Maj decker?—A. It was turned over to Major Lydecker soon after t propriation was made. I can give you the exact date.

Q. Was that the appropriation of 1882?—A. Yes. [After ref to papers.] Major Lydecker was assigned to the charge of the August 11, 1882.

Q. And the first appropriation actually available for even an e ment, as it regards the nature of the rock at Rock Creek, on you inal plan, was not made until 1882?—A. No, sir; July, 1882.

Q. So that down to the time of your official disconnection wi work there were no funds available with which you could have the nature of the rock there as preliminary to undertaking to b tunnel at all?—A. No, sir. For that reason that statement or es is made hypothetically, clearly showing that no such examinatio been made. You understand that before the act passed there w assignment to the charge of the work whatever until Major Ly took possession. The act was approved July, 1882, I think, a

oney became then available, and in August, 1882, the first assignment the control of the work under that appropriation was made to Major ydecker; in other words, he had the first opportunity to do anything ith it.

Q. Down to that time, when the appropriation was made and you ased to have any official connection with the work, had you changed modified the plan and theory upon which your idea of the extension the water supply had been based, and which you have already deribed?—A. I had discussed with Major Twining such things, but it ad never been put before the public or before anybody; we had only scussed it between ourselves.

Q. Had you come to any definite conclusion upon the subject?—A. mply this: Assuming the same hypothesis—that is to say, predicated oon the same condition, of the discovery of suitable strata in which to o it—we thought that a continuous tunnel would probably be preferble to an ordinary surface conduit.

Q. What do you mean by suitable strata?—A. Rock that would be rm, compact, and solid, and below the general limit of surface disingration, and requiring generally no lining.

Q. Did you take into consideration how deep you would have to go r such rock if you were obliged to?—A. Of course, now, I am speakg from memory; nothing was ever in writing. These were simply nversations between Major Twining and myself while the matter was ending in Congress. I know that we examined into all the literature the subject, went into it exhaustively, so far as our investigation as concerned.

Q. Yes; but I want to bring you right to the point of knowing, if you member, whether you and Major Lydecker in these discussions (which ou say were unofficial), and as to which no official communication was ade to anybody, in considering the feasibility of a continuous tunnel l the way through generally sound, compact rock, requiring nothing t the drift of the tunnel through it) considered how deep, under genally economical and good administration, you would have to go down to the ground to find such kind of rock to drive your tunnel through. hat is, supposing that in going down fifty feet below Rock Creek hich was the lowest point, I suppose, on the line) you found you had ot reached the kind of rock which was essential, on your theory, how uch further would you have gone when you and Major Twining disssed that, in order to get that rock? I take it that you would not ave thought it necessary to go down 1,000 feet?—A. No, sir.

Q. How deep would it have been necessary to go to find that kind of ck rather than something else?—A. As I remember it now, we had me to no definite conclusion at that time as to how deep it would be esirable to go, but I can give you some idea in regard to it by saying at the present tunnel could have been lowered 150 feet at a cost of 0,000.

Q. That is 150 feet lower than it is now?—A. Lower than the present ade. That was done in the case of the New York Harlem River tunl, which is a link in the new New York aqueduct supply. That is e increased depth which they gave that tunnel for that specific purse. When they got down to the point that they had theoretically nsidered would be the proper depth, they found that they had undertimated it, and that at that theoretical depth the disintegration had nerally penetrated; so they went down 150 deeper, and there found the ck so compact and firm that there was an actual fusion between the o different kinds of rock; the heat or pressure, or whatever it may

be, had so consolidated the metamorphic rock that the two port
different kind of rock were actually fused and united perfectly.

Q. Do you understand that they built that tunnel 300 feet bel
surface?—A. Yes, sir; 300 feet is an economical distance.

Q. Is that now in operation?—A. Not yet; but I think it i
pleted.

Q. Do you know for what purpose the enormous iron structure
form of a bridge, is that is just north of the old aqueduct bridge
ing Harlem River?

The WITNESS. You mean the old Croton aqueduct bridge?

The CHAIRMAN. Yes; right north of that I have seen a ne
iron bridge, the top of which is just up to the elevation of the
aqueduct bridge, which has been famous so long, and is famo
forty years or more after it was built; and that I have been to
for the purpose of carrying water across to Manhattan Island.

The WITNESS. Oh, no, sir; the continuation of the aqueduct t
by a 7-mile tunnel like this 4-mile tunnel here.

Q. That is not 7 miles at the depth of 300 feet under Harlem Ri
A. No, sir; not that distance under Harlem River, but there are
under pressure. I think that bridge is simply a viaduct to carry
over.

Q. I was told that it was an aqueduct bridge. What is that
tunnel?—A. It is a rock tunnel, force conduit, like ours, but the
est part, I will mention to you, now passes under Harlem River.

Q. Yes, that is the deepest part, but what is the amount of h
pressure on the other parts of it?—A. I don't know that; I do
call it; but here it is 450 feet head. I will get that accurately. I
I am right about it, but if I find that I am mistaken I will cor
At any rate, it is very near that in round numbers.

Q. You have heard also, I suppose, that there has been consid
trouble about the construction of that?—A. Yes, that was the t
starting it too high; they did not get down below surface disi
tion.

Q. But that tunnel is not in use?—A. No, sir.

Q. How it will work practically remains to be seen.—A. Rem
be seen. But that is not the system now established for lake s

Q. We understand the system of lake supply perfectly. Now
ask you, finally, if I am right in supposing that down to the ti
severed your connection with the water business of the Distric
had been no official change of plan at all from the recommendati
had previously made.—A. None whatever.

Q. And that all that had occurred, as regards a continuous t
was simply discussion, unofficial and unreported officially to the
of Engineers or anybody else, between yourself and Major Twini
A. That is all; it was all in the air.

Q. What were the difficulties, if any, of continuing a conduit,
gous to the one that comes from Great Falls to the reservoir
Georgetown, around the hills and across Rock Creek, either b
suggested plan, if the rock was of the proper character, or by iron
carried below the surface of Rock Creek and coming up again
side to a flowing conduit, or by a bridge over Rock Creek? What
be any other practical difficulty to be overcome that would be di
from the difficulties that were overcome in bringing water fr
Great Falls?—A. Indeed there are no difficulties along the whol
other than those similar to the difficulties that were encountered
upper portion of the aqueduct; that is, that was partly tunneled i

ces where it was desirable to do so, but it generally follows the curve the contour so as to give the least excavation necessary. In that e the ridges lie more favorably to this contouring above the distribut- reservoir than they do below. In this case there are more trans- se valleys, and therefore the construction would be more expensive.

Q. The two principal ones would be Rock Creek and Foundry anch, would they not?—A. Yes.

Q. The Champlain Valley could be almost entirely avoided by going ther to the north?—A. Yes, I think it could; and I think that is at Major Twining and myself contemplated.

Q. A flowing conduit of that character, like the one that now exists m Great Falls, is I suppose, as a matter of course, much more easily cessible to repairs, in case of accidents, than any deep conduit, either der pressure or whatever, would be?—A. Yes, sir; but, on the ner hand, it would also be much more liable to accident and subject depredations from being near the surface, and also subject to the lution of the water. For instance, Major Twining and myself would ve abandoned the line we adopted, first, inevitably, because in pass- through Georgetown on that steep hillside, which you know comes wn there, that conduit would have been laid in a trench all through orgetown, which is an old city, with polluted soil, the superficial ata consisting of decomposed rock, extremely porous, and admitting water like a sieve, and that trench being unfortunately just at the th for the receiving conduit. Such a line would have constituted, fact, an intercepting sewer, and would have polluted the water iously. That consideration did not occur to us at that time, or we uld have had to modify that line and take it around behind George- wn; but, even then, the growth of population would have gone over the other slope and would have soon made the same trouble there. that rock trench there would have been great danger of pollution the water.

Q. Assume that your tunnel passes right under a city, and that preponderance of counter-pressure, owing to the head of water hin the tunnel, would substantially terminate at the height of 100 t above the lowest place; then suppose that you had the tunnel ed all the way through, and that there were water exterior to that ing, surrounding it, in the rock; now let us suppose that a sec- n of that brick lining becomes cracked, or there is a hole in it from y cause; in such a case why would not your city drainage water or drainage water from the hills mingle with the tunnel water?—A. the first place, the tendency is to exfiltration, not infiltration. There always a subterranean flow of ground water; it is moving in some rection; it is not a stagnant pond. That would be fed, not from the urce of ground water, but from the aqueduct itself; that is, there uld be constant exfiltration and not infiltration.

Q. If you got up to the level where the external pressure of the water s equal to the head of the internal pressure of the water, then the tside water would have the same tendency to come in as the inside ter would have to go out; is not that the case?—A. If such a thing re practicable, you would have the conduit flowing through a stag- nt pond, with no tendency to either exfiltration or infiltration. The vement in that conduit would depend entirely upon the excess in her source of supply.

Q. That is upon the superiority of head pressure?—A. Yes; that is But for the aqueduct proper you see you have this unlimited supply water coming in all the time, and for the ground water that is simply

seepage. But there is another reason why the tunnel would not l
taminated, and that is that this foul water rarely reaches that lev
percolates readily through the very loose upper strata of rock, bu
it gets down to where the rock is less decomposed there the roc
mences to act as a strainer, a purifier, and when it gets dow
enough it finds a stratum of rock which is practically water-proo

Q. And that stratum it would not go through?—A. It would
through. Meanwhile this surface seepage has been moving
towards the valleys.

Q. Suppose you were to be informed, or find it out as a fact
spection, that this very tunnel excavation itself has drained w
the neighborhood, along at different places, and that water th
near the surface of the earth has found means of getting down in
tunnel?—A. I suppose it could in places; but what I speak of i
nary foul seepage from over a large area. The entrance of
through a crack in the rock would not affect the water in the
seriously, but it would be by the general seepage of a large area
would come by tapping that large area of permeable material.

Q. Let us suppose that the strata of this rock for 4 miles are i
eral of such a loose character that drifts and seams are utterly de
ized and decomposed in places, so that it is a mere sponge, so
water is concerned. Let us assume that to be the fact; why wou
that hole in the ground, not being used at all now, we will say, a
ing kept empty by pumps, be an intercepting sewer which would
a very large proportion of all the foul surface water from the cou
the northward for a considerable distance?—A. That is a difficul
tion to answer, Mr. Chairman, without knowing exactly to what
this rock was porous. I can readily imagine the extreme case
mentioned, that of running the trench through Georgetown for
face conduit. There you have the worst possible conditions. You
have rock utterly demoralized for 50 or 60 feet lower down until
you would reach a point where you would be below all that.

Q. But suppose you did not go below that, and the rock was s
all the way from the surface, would it not be true that the lower yo
the greater would be the pressure from the external sources ab
get into your tunnel?—A. No, sir; that is a constant factor; t
the deeper you go down in the tunnel, beyond a certain limit, it
no difference whatever is the resultant pressure, either in or out
instance, you have a certain level of ground water outside, we w
the mean level of ground water in that section of the country; th
side you have this pressure, due to the head at the source of sup

Q. I am not on the question of your tunnel being in operation
speaking of what would be the natural physical effect, within th
itations that I have described to you, of going down to where th
tom of this tunnel is now, in regard to its taking more surface an
water from the strata above it when it went down 100 feet tha
should go 10 feet.

The WITNESS. And be kept pumped out?

The CHAIRMAN. Yes; it would intercept everything, would i
the rock being of the character I have described?

The WITNESS. Of course it all has a straining effect.

Q. I am not on the question as to how much you are going t
and strain the water, but I am on the question of the compa
physical effect of water going down 100 feet towards the bottom
tunnel and its going 10 feet.—A. Water, of course, will go down
as it can into a permeable material.

Q. And the further you go down through a permeable material that
pen and rifty, and all that, the more apt you are to get more of the
ter that comes from above it than if you did not go so far, are you
t?—A. Yes; for the reason that it goes down, as all wells filled on
pes will increase in their superficial area as you go up.
Q. Exactly; it is perfectly obvious, as I supposed. Now, let me ask
u whether, in your opinion, a surface conduit would be more liable
infiltration because you have diminished the pressure on the inside,
en, if you keep it near the surface, you have also diminished pressure
the outside, have you not?—A. You have diminished pressure, but
u have offered every facility for it to come in.
Q. Suppose you have a flowing conduit tunnel, the bottom of which
10 feet below the surface, and you have that tunnel made of bricks
d cement so that the water flows through it with only that amount of
filtration or infiltration that can be carried through a brick with a
-foot head at the most, the very bottom brick being only 10 feet below
e surface, you can not possibly have a greater pressure than the same
feet of head, can you, because you have got right up to the sur-
ce?—A. A surface-conduit is never run full.
Q. Please answer the question. I am not on the question whether
conduit is run full or not full. My precise question is, assuming that
have a conduit that is only 10 feet below the surface of the ground
its bottom, and that the tunnel is built of bricks and mortar; and
en the question supposes at the most a 10-foot head from the very sur-
ce to the bottom of the conduit. Then the question is whether you
n have more than a 10-foot head on the outside, supposing that the
nduit was drained out entirely empty?
The WITNESS. The surface of the conduit being at the surface of the
ound?
The CHAIRMAN. Yes; put it that way in order to get at your idea.
The WITNESS. To make your question precise that would be a nec-
sary condition. There could be no greater.
Q. Then the greater danger of getting surface water into a conduit
ich is close to the surface, if I understand you, would be the circum-
nce that the surface foul water more readily finds its approach to
e exterior conduit than it would if the conduit were 100 feet down?—
Please repeat the question, Mr. Chairman, because you are much
re expert at asking than I am at answering. I want to answer cate-
rically, but my mind has been turned toward other things.
Q. You stated awhile ago, if I understood you, that one objection to
lowing conduit, aside from its greater exposure to accident, malice,
., would be the danger of foul water from the surface getting into it,
l you not?—A. Yes, sir.
Q. Now my question is, supposing a surface conduit to have its bot-
n only 10 feet below the surface of the ground, and to be built of
ick and mortar in the way I have described, and to be perfectly empty
the inside, the excess of danger of foul water getting into it must
, must it not, merely the fact that the foul water is right on the
rface of the ground and finds access to the exterior of the conduit more
mediately and quickly than it would if the conduit were 200 or 300
400 feet below the surface?
The WITNESS. You are asking now simply as to the practicability of
t water getting in, and your question does not go to the character
the surface water as affected by filtration downward?
The CHAIRMAN. No; it does not touch the question of the character
the water that would reach the lower place; it only goes to the ques-

tion of the likelihood of water, good or bad, from the surface, gett into the inside of that conduit.

The WITNESS. And the conduit is supposed to be empty, and n water carrier?

The CHAIRMAN. In both instances it is now supposed to be em and not carrying water. To be reached on the inside and on the outs it is exposed, in the case I have suggested, 300 feet down, to the co tions that I have already described and as to which you have answe Now I bring it up so that its bottom is only 10 feet from the surf My question is now, how much more likely is any water that is f the surface to get into the conduit that is at the surface substanti than it is to get into that which is 300 feet down, and why it is n likely, if you think it is more likely at all?

The WITNESS. Water would be more likely to enter an empty con at greater depth. Given the same tightness of joints, and all that of thing, of course the tendency of water to enter into an empty con would depend upon the head or pressure outside inward. Given same character of shell of your conduit, and the same facility of m ment of the water outside through the super-incumbent strata, t of course, the greater the depth of that conduit the great will be head for forcing water into it.

Q. Then the empty shell in the cases we have supposed—either or not—at the surface substantially, would be not any more likel take water into it from the outside than the empty shell at the bottom A. But under the conditions, as I remember them now, as you h stated, the empty shell at the surface would not accumulate water more rapidly, or as rapidly, with the head, as a function of pres through, as the conduit at the greater depth.

Q. I suppose the head is the function of pressing through, is it leaving aside the question of capilarity which would be present in b cases?—A. Yes, sir.

Q. Then how can it be that a surface conduit would be more exp to danger from surface water than the deep one, if the deep one v in a character of rock which was entirely open to the movemen water?

The WITNESS. Now you are asking as to the conduit running fu water.

The CHAIRMAN. Now I am asking as to a conduit running fu water, the tunnel being full.

The WITNESS. The surface conduit not run under pressure is n run full, not intended to be, because it makes a pressure upon the which is considered dangerous. There is an open space in the up part, between the upper surface of the water and the inner surfac the crown of the arch, and consequently the head of the water in conduit is something less than the diameter of your conduit. Bes that, it is not proper to leave your conduit close to the surface of ground. It ought to be buried 3 or 4 or 5 feet at any rate, for the pro tion of the arch.

Q. That is a mere question of degree, which we all understand fectly. I am speaking now of a surface conduit merely, with refer to getting at how much counter-pressure there would be in the one as well as the other; and what I want to find out is whether you explain to me how, supposing the counter-pressure of the inside w in the tunnel, 300 feet down, is better to keep out exterior water f it than a similar counter-pressure in excess of external pressure at surface, as I say, substantially? How can it make any differenc

at point of view whether your tunnel is away down or at the surface? it not just as apt to keep out the water when it is subsantially at the rface as if it were 1,000 feet down?—A. Certainly it is, if you have e counter-pressure.

Q. Then if you could have a surface conduit, the pressure of which on e interior of the shell was greater than the pressure of the water hich came through exterior to the shell, it would be just as secure om pollution as it would if it were deeper in the ground, would it not? mean pollution in consequence of percolation, and not in conse- uence of mischief.—A. If you could always have an excess of pressure n the inside it might perhaps be so, except for this fact; but I need not ake any exception. If you could always maintain that greater inside ressure, and if you could thoroughly protect the part of the arch hich is above the influence of any internal pressure, and if you could ways maintain a pressure on the inside of your conduit greater at ery point of the circumference subject to infiltration than any which ould come from without, it seems to me now, though I am answering promptu, that there could be no danger of fouling of the water.

Q. The danger, be it much or little, would be exactly the same in e two cases supposed, of course, would it not?

The WITNESS. The danger of infiltration?

The CHAIRMAN. Yes.

The WITNESS. Neglecting the difference in the character of the ater on the surface?

The CHAIRMAN. Yes; leaving that out entirely?

The WITNESS. Yes.

Q. Now, we will suppose your deep conduit (having been in use and ing surrounded by a vast quantity, in the fissures of the rock, of ater that had come from a city surface) gets out of order so that it is ecessary to empty it for the purpose of reparation or cleansing, then u would have your mass of city water under a very heavy pressure the outside, would you not? Or else, if the reparation was of a aracter which implied an opening, you would have to pump it out or t out not only what properly came into it from different sources, but so all the water that would be retained in the surrounding masses rock and which would come rushing into any hole that might have en made?—A. You would have to pump out, of course, all the infil- ation.

Q. And if there was a hole 4 feet square broken somewhere in the ell, of course you would have to pump out everything that came rough that hole?—A. Yes.

Q. And then you would have in the interior of your tunnel all this ass of water, of whatever character it might be, that surrounded it the fissures of the rock?—A. Of course it would drain those fissures.

Q. So that when your deep conduit was empty it would be subject a greater strain for the time being and to greater danger of exterior ater coming in than would the surface conduit, would it not?

The WITNESS. During the time you are pumping it out?

The CHAIRMAN. During the time the gates were closed at its source supply.

The WITNESS. Suppose I answer your question as I understand it.

The CHAIRMAN. That is the way to answer all questions.

The WITNESS. The process of pumping out that tunnel under those rcumstances would exhaust the water from every crevice that would ain into that tunnel.

Q. Yes; that must be clear, I think. Is this existing conduit that

comes to the distributing reservoir one that is never filled full?—No, sir; it may be filled full at one or two places, I do not remem where, but habitually it is not allowed to run full.

Q. But it is built upon the idea that it may run full and under a tain pressure on the key of the arch at such times?—A. Yes; an think its strength is quite ample for that purpose. It is built v strongly and solidly. It is a well constructed piece of work, and depth below the surface is such that I think General Meigs estim that it can be run under a head of two or three feet with safety.

Q. There is no mechanical difficulty in building a surface condu what we call a surface conduit—substantially like the one up there such a way as to have that conduit run full under a head of 4 or 5 or 8 or 10 feet of water, is there?—A. There is no mechanical difficu of course it can be done; but 10 feet would be rather excessive.

Q. How much would that be to the square inch?—A. That is an hand question that I couldn't answer without making computations

Q. It would be merely a question of the amount of material and degree of strength and solidity with which you build it, would it not A. Yes, sir.

Q. And if you had it running under pressure which was superio the pressure of the external water at a similarly low head—as of cou it must be—then it would be just as safe from pollution as if it w deeper and under a greater external pressure.—A. As a force cond even through the upper strata—though I am speaking now perh without sufficient reflection upon that particular point—I think it co be run without serious danger of pollution. Of course, conduits not ordinarily intended to run under head, but there are various dev for aiding that; for instance, they have bricks which lock togeth and which, of course, greatly increase the strength of the structure. though the cost of using such bricks is greater; but even then i considered dangerous, for every foot of pressure added to maso structure of that sort is, perhaps, in the absence of sufficient experien considered to be dangerous.

Q. Of course it is a mere question of strength, just as the amoun pressure inside a locomotive boiler is; the boiler could be made m more cheaply to carry 10 pounds of steam than to carry 100 poun still the nature of the strain is precisely the same in both cases, thou the difficulty of control might increase more rapidly?—A. Yes.

Q. Of course every foot of head that you give to water, every f of increase of pressure, multiplies the strain upon the circle in an actly inverse ratio to what it would in the case of ordinary arches wh the strain would be from the exterior; that is all there is to it, i not?—A. No, sir; that is not all there is to it.

Q. Tell me what else there is to it.—A. You must consider the dif ence in material. Masonry is non-elastic, and is never intended to st tensile strain.

Q. That would be as true if your brick shells were 1,000 feet bel ground as if they were 1,000 feet above?—A. Unquestionably.

Q. That is all I wanted to get at, the mechanical strain upon br in the two cases, one at the surface, and the other 100 feet or m below the surface. Of course the law of strain would be precisely same in all cases, would it not?—A. Unquestionably.

Q. You may now explain, if you wish to, all you know concerning change in your plan, which was for a conduit of a generally flow character, and through rock of a good character, as you have describ to the thing that we now have, and that is a continuous tunnel, if y

now anything about such change.—A. Oh, yes, I know something bout it.

Q. Well, tell us. I think you have already said that no communication was made to the Chief of Engineers or to the District Commissioners t any time upon that subject during your official connection with it?—. Under Major Twining, no.

Q. Or during your official connection with it later on, if you were connected with it later on.—A. I was, as assistant to Major Lydecker.

Q. Now come to that. Down to that time nothing had been done fficially in regard to anything else than what you have already described?—A. No, sir.

Mr. DAWES. Up to that time was it the idea to go down on one side f Rock Creek and up on the other?

The CHAIRMAN. Yes; the idea was to go down by shaft on one side f Rock Creek and come up by shaft on the other side, the horizontal istance between the two shafts below being of suitable length.

Mr. DAWES. And suitable to the general flowing grade.

The CHAIRMAN. That is as I understand it.

The WITNESS. Yes.

By Mr. DAWES:

Q. You were to have a flowing aqueduct with that exception?—A. es, sir.

Q. That was your idea?—A. Yes, sir; it was substantially a continuation of the Washington Aqueduct. May I add there, Mr. Chairman, han even this link of exceptional character in the chain of water supply as based solely upon the result of finding borings satisfactory in this ock, so as to indicate that the material was suitable for the purpose?

The CHAIRMAN. That you fully described before.

Mr. DAWES. That I shall find out in reading Captain Hoxie's testiony, but I thought I might be better able to understand what he shall y hereafter if I ask him this question now.

By the CHAIRMAN:

Q. Major Lydecker having assumed charge, I infer that it became our duty to work under him?—A. Yes; I was detailed as his assistnt.

Q. Were you detailed by the Engineer Commissioner or by the Chief f Engineers?—A. By the Chief of Engineers. I can define my position, erhaps, more clearly by saying that I continued to act as Major Lyecker's assistant, without further detail, as the successor to Major wining, which Major Lydecker was; and when he took charge of the xtension of the Washington Aqueduct I was assigned to him on Auust 11, 1882, and he requested the Chief of Engineers to detail me as is assistant also in that capacity. Whether any written order was ade to that effect I do not now remember, but, at any rate, I was deailed as his assistant. That was my first official connection with the ork done under the act appropriating money for the extension of the Vashington Aqueduct. The change of plan from that which had had he attention of Congress is first given in Major Lydecker's first project, hich was submitted October 5, 1882. He says:

I have the honor to submit the following project for carrying into effect the requirements of the act to increase the water supply of the city of Washington and for other rposes, approved July 15, 1882.

The first section directs that certain surveys be made, and specifies the manner in hich title to lands required for the purpose of the act shall be obtained. In this nnection it is provided as a preliminary to active operations, that "the Secretary

of War shall cause to be made a survey and map of the land necessary to extend Washington Aqueduct from its present eastern terminus to the high ground nort Washington, near Sixth street extended." * * * The second section of this directs the execution of several items of work, and the third appropriates for the s as follows:

First. Extension of the Washington Aqueduct from its present eastern termin the high ground north of Washington, near Sixth street extended; appropria $599,534.55, and for land for extension, $51,370.

For the immediate requirements of this project the first item is the important and its consideration has been the subject of the most careful study; believing, ever, that a detailed statement on this point would extend the report unnecessa I simply submit for the present that the construction of a tunnel from the distribu reservoir to that proposed on the heights near Sixth street extended will accom the desired object in the best and most substantial manner, at the least cost, a the shortest time practicable. There is no reasonable doubt that this tunnel ca carried through solid rock in a direct line between the terminal points, and u these circumstances with the perfected machinery of the present day, its constru would become a simple piece of engineering work. The cost and rate of progress w depend almost entirely on the character of machinery in use, and on the degree telligence with which the work is directed. Based on the known cost of compl work of like character, $8 per cubic yard for the excavation would be an outside mate; it would, in all probability, cost less. The length of tunnel will be a 21,400 feet, requiring a total excavation, including shafts, of about 66,250 yards; estimated at $8 per cubic yard the total cost of excavation of about $530 leaving a balance of the amount appropriated of $70,000 available for contingen such, for instance, as lining for tunnel wherever it might be found necessary.

If the tunnel can be driven in solid rock (and every indication favors this ass tion), it is apparent that we can rely with certainty upon a continuous progre the work of construction, regardless of season or weather upon its permanence, w out expenditure for repairs, and upon its easy subsequent enlargement at smal pense.

The only alternative to a tunnel would be a surface conduit, which would none of the advantages referred to above, while the natural features would requ very considerable increase in its length in order to avoid excessive excavations complicated engineering difficulties, such as would follow its construction on a d line. Besides, the surface conduit would demand the appropriation of a contin strip of land, which would not be the case if the work is made entirely in tunnel, it is very doubtful if the land could be acquired with the sum allotted for that pose.

With these views, I have no hesitation in recommending the adoption of the tu system, leaving minor details to be determined upon after obtaining the conclu data that will be supplied on sinking the initial shaft at the site of the new reser if compact, solid rock is not reached within a reasonable limit, the project ca modified before arriving at any expenditure approximating that which would been required for a series of preliminary borings sufficient to warrant a positive tion of the question.

Q. Whose statement is that?—A. That is the project of Major decker.

Q. Those are his words?—A. These are his words.

Q. That is a communication to the Chief of Engineers?—A. from Major Lydecker.

Q. The Chief of Engineers was then General Wright?—A. Yes,

Q. And that was the initiation of the abandonment of the orig plan, that you have already described, and going into the tunnel b ness?—A. Yes, sir.

Q. What did General Wright, the Chief of Engineers, do abou when he got that report?—A. I will quote Major Lydecker:

This was forwarded to the honorable Secretary of War with the following ind ment by the Chief of Engineers:

"In this project Major Lydecker explains what has been done in the way of sur and examinations, and makes recommendations as to the order in which the va operations should be undertaken and the manner of carrying them out. The po of the project which, however, now requires action, is that relating to the new duit, forming the extension of the aqueduct from the present receiving reservo the new reservoir, provided for in the act.

"This extension, he recommends, shall be by a tunnel running in a nearly stra

e from the eastern end of the present aqueduct to the new reservoir, and passing
ler the bed of Rock Creek where the line crosses that stream. The reasons assigned
him for preferring the tunnel to a surface conduit seem to be satisfactory, provided
ther examination sustains his present opinion that solid rock will be found gen-
lly along the line. He also recommends that this portion of the project be carried
by hired labor, and not by contract, giving strong reasons for the preference; yet
n not satisfied that the work should be done in this way. All the acts of Congress
relation to public works look to their execution by contract when practicable,
l it is hoped that specifications may be so drawn as to clearly cover all the details
work and enable contractors to bid understandingly. It is not necessary, however,
t this point be definitely decided now, and it may, therefore, be deferred till more
nite information regarding the character of materials through which the tunnel
o pass has been secured.

I therefore recommend that the project for extending the Washington Aqueduct
tunneling be provisionally approved, its final adoption to depend on further exam-
tions confirming the present opinion that solid rock will be found generally along
proposed line; that Major Lydecker be authorized to sink one or more shafts for
purpose of ascertaining the character of the underlying materials, and that the
stion of the manner of executing the work on the tunnel, whether by hired labor
y contract, remain in abeyance for the present.

A preliminary sketch, showing the proposed route of the aqueduct extension, with
ngitudinal section along the same, is herewith."

Q. That report of Major Lydecker, which you have referred to be-
e, was made while you were his assistant?—A. Yes, sir.

Q. Now, had you or Major Lydecker, or anybody under his direction,
the time of making that report to the Chief of Engineers, made any
perimental borings, or taken any other steps to know what the con-
ion of the rock was below the surface?—A. No, sir; nothing suffi-
nt to determine the character of the rock at the level at which the
nnel might be placed.

Q. What had you actually done in the way of sinking any boring?—
Nothing except to ascertain the surface indications showing the out-
p of rock and the character of that which it was depending upon;
other words, of the surface indications so as to arrive at a reasonable
sumption as to the character of the rock at the depth of bed-rock.

Q. So that when the report of Major Lydecker was made to the Chief
Engineers nothing had been done in the way of experiment below
surface of the earth?—A. I think that a hole was bored at Eighth
eet when the line of the tunnel was put down below the surface of
earth, but only to the surface of the rock. I may be mistaken about
t.

Q. To find how deep it was to the bed-rock?—A. Yes. I may be mis-
en, but I think that was put down before this project.

Q. Then no test as to the character of the rock had been made at all,
cept the test of observation where you could get at it by going over
ground?—A. Yes, surface indications.

Q. So that this radical departure from the original plan was adopted
Major Lydecker, as officially reported, only upon the facts that you
re already mentioned?—A. Surface indications, yes.

Q. Is it or not the regular course in the office of the Chief of Engi-
rs or elsewhere in the Department of War, when an important change
made or an important work is about to be inaugurated, and is pro-
ed by the engineer in charge, for the Secretary of War, or the Chief
Engineers, or some person in authority to refer that matter to what is
led an engineer board?—A. It is frequently done.

Q. Is it not the usual course?—Y. Yes; in the sense in which I un-
rstand you to use the word "usual"—customary.

Q. Do you happen to remember any other important work than this,
important change of plan like this, in the course of your experience
engineer, that did not go through that method of consideration and

investigation by a board before it was adopted?—A. None occurs me at present.

Q. Do you know how it happened that that report of Major Lydec got through the office of the Chief of Engineers, even with the quali and conditioned approval of General Wright, without the usual co being pursued?—A. No; I do not.

Q. Did you ever hear anything said about it?—A. I do not re anything; no, sir.

Q. Now, this recommendation of Major Wright to the Secretar War was approved by him?

The WITNESS. By the Secretary of War?

The CHAIRMAN. Yes.

The WITNESS. Yes, sir. I have it here. Shall I read it to you

The CHAIRMAN. Yes, you may read it.

The WITNESS. These are all extracts from Major Lydecker's rep

The above recommendations having been approved, I was instructed by letter the Chief of Engineers, dated October 20, 1882, as follows:

"Your project of the 5th instant for carrying into effect the requirements o act of July 15, 1882, 'to increase the water supply of the city of Washington, a other purposes,' has been submitted to the Secretary of War with letter of this of the 12th instant, of which a copy is herewith inclosed, and returned with h proval of the recommendation of the Chief of Engineers in relation thereto. Yo be governed accordingly."

That was the action of the Secretary of War given to Major decker.

Q. What did your office or Major Lydecker do in regard to carr out the conditions imposed by the Chief of Engineers, as regards ma it certain that the rock where the tunnel was to go was of that cha ter you presumed it to be?—A. That is given here in these words:

In order to accomplish the purpose indicated above, the work of sinking a shaft at the easterly terminus of the proposed tunnel was commenced about t of November, and examinations were made at many localities along the propose of tunnel in order to determine, approximately at least, the level of solid rock. operations continued until the close of the fiscal year, the shaft in the meantim ing been driven into the rock at an elevation of 29 feet above tide. The resul tained are set forth in my final project, and accompanying report by Captain H which were submitted under date of July 14, 1883, as follows:

"Referring to the project for the extension of the Washington Aqueduct, subm in my letter dated October 5, 1882, and to the action taken thereon, whereby i 'provisionally approved, its final adoption to depend on further examinations firming the present opinion that soldid rock will be found generally along the posed line; that Major Lydecker be authorized to sink one or more shafts f purpose of ascertaining the character of the underlying material, and that the tion of the manner of executing the work, whether by hired labor or by con remain in abeyance for the present,' I have now the honor to report the comp of the proposed examinations, and to recommend the final adoption of that pr the examinations having satisfied the conditions expressed above. The trial was started at the eastern terminus of the proposed conduit, in the grounds o Howard University, for the reason that every condition indicated that bed-rock be at a lower elevation there than at any other part of the line, and that ther the maximum difficulties of sinking a shaft would be encountered; it was my to test the project where the conditions most unfavorable for its adoption were found."

Q. How deep into the rock had that shaft gone when that parag was written?—A. Just to the surface of the bed-rock. The pr continues:

The shaft was commenced at an elevation of 145 feet above tide, and rock reached at an elevation of 29 feet, giving 116 feet for its length. The interme material, commencing at the top and going down, was as follows:

Fifteen feet yellow clay and sand, with water, which was diverted by dra trench.

Forty-nine feet hard clay.

Twenty-one feet sand, including about 4 inches in thickness of hard crust at bottom of this sand, consisting of sand and quartz pebbles, cemented with oxide of iron. This stratum contained nearly all the water encountered in sinking the shaft.

Eight feet four inches of talcose clay resembling steatite, and consisting largely of silicate of magnesia, very hard and with 4 inches of crust at the bottom of this deposit, similar to that at the top.

Ten feet sand, including 4 inches hard crust at bottom, similar to the other two, somewhat harder than either.

Two feet mixed clay and sand with little water; 9 feet 10 inches of very dark clay, mixed with sand containing fragments of carbonized wood, passing gradually into black sand which was cemented together sufficiently to maintain a vertical face under water, and contained rounded pebbles varying from 1 to 8 inches in largest dimensions. Ten inches of green sand, which rested directly upon bed rock. The maximum flow of water into the shaft was 30 gallons per minute. The clear horizontal section of the shaft at top is 6 feet by 6 feet, and at bottom 4 feet by 4 feet; it is timber lined throughout.

Q. If he said anything about going into that rock which he finally reached, tell us what he said.—A. He did not go into it.

Q. So except that, the recommendation for the final adoption of that plan, which had been approved provisionally upon the substantial demonstration as to the suitable character of the rock, was made by Major Lydecker with only a shaft sunk through the earth to the surface of the rock out here at Howard University?—A. And a hole bored or similarly sunk to the surface of the rock some distance west of that.

Q. To the surface of the rock?—A. Yes.

Q. So that the quality of the rock at the depth where it was intended the tunnel should go was absolutely unknown and absolutely untested at the time of this second report to the Chief of Engineers recommending the final adoption of the plan?—A. Yes, sir.

Q. Can you explain how that happened?—A. No, sir.

Q. Did you understand that that carried out the requirement of the Chief of Engineers in his provisional approval?—A. It carried out my instructions from Major Lydecker, and I assumed that it did. My exploration was directed simply to the discovery of bed rock. I considered that the terms "solid rock" and "bed rock" were synonymous, and all the exploration I conducted was with that object in view.

By Mr. McMILLIN:

Q. How far under the surface did you contemplate putting the tunnel at first?

The WITNESS. Originally?

Mr. McMILLIN. Yes.

The WITNESS. My original plan, the one I presented, and which was presented to Congress, did not contemplate any deep tunnel at all, except at the crossing at Rock Creek, and then the suggestion was simply hypothetical, and was to depend upon the discovery, by boring, of suitable rock for driving that tunnel.

By Mr. DAWES:

Q. Whether you went down on the west side of Rock Creek and came up on the east side depended upon the character of the rock?—A. Yes, the character of the rock to be ascertained by boring.

Q. Otherwise how did you propose to get across Rock Creek?—A. Another alternative proposal in the same project was to gang cast-iron mains. I borrowed that idea from General Meigs; it was a very plausible one, but he afterwards abandoned it himself. That idea meant a number of these mains parallel to each other, going down as siphons, and coming up on the other side, laid only a slight distance below the surface. The general idea was that you could lay two or three or four

of them to meet any immediate necessity, and add to the number fro time to time as required, and as the length was not very great the a ditional cost would not be very great either.

Q. Why did he abandon that idea?—A. I do not know, but I suppo because he thought his plate-iron conduit across that valley would cheaper.

By the CHAIRMAN:

Q. Major Lydecker having now made a final recommendation up the mode of exploration which you have described, that was report to the Chief of Engineers, I suppose; that is a part of what you ha read?—A. Yes.

Q. Did the Chief of Engineers approve that?—A. The approval of t foregoing project of Major Lydecker was communicated to him by D partment letter dated July 30, 1883.

Q. Please read what the Department says.—A. I have not that le ter; it did not appear in his annual report. Although that is not quotation, that is substantially as he reports it.

Q. That approval, I suppose, was made without any reference to board of engineers?—A. I think so, but I am not fully informed.

Q. You never heard of any board of engineers taking the matter in consideration, did you?—A. No, sir; and I never saw the letter.

Q. As you were on the spot, in the city, you would have been like to hear of that consideration if it had taken place, would you not?—. Yes, sir; but I do not think it is at all probable that it did take plac

Q. This last was an unqualified approval, as I understand?—A. Ye sir.

Q. You may state what you did next as long as you continued there. A. That is practically all that was done while I was there.

Q. Had any work been begun on a shaft in rock anywhere when y left?—A. Three shafts had been started, but very little progress ha been made. I would like to read this, as it answers your question:

On January 4, 1884, I found upon my table in the aqueduct office the followi order, for which I was quite unprepared. The work was fairly launched, but a lar amount of detail remained to be perfected. Ground had been broken at three of t shafts, but no considerable progress made:

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., January 3, 1884

Order.—First Lieut. Thomas W. Symons, Corps of Engineers, having, by direction the Secretary of War, reported to the undersigned for duty upon the Washingt aqueduct and the extension thereof, is hereby assigned as superintending engineer the work, and as such will assume control of all active operations relating there He will be obeyed and respected accordingly, and to that end all employés will rep to and receive their instructions from him direct.

G. J. LYDECKER,
Major of Engineers, U. S. Army.

Lieutenant Symons took immediate possession of my desk at the aqueduct offi and my official connection with this work then terminated.

I found that order on my table on January 4, 1884. I had nothi further to do with the work after that time and was not informed as its progress.

Q. Three shafts were in progress at the date of your being separat from the work?—A. Yes, sir.

Q. Had any one of those shafts, and if so which, been carried in rock?—A. No, sir.

Q. They were all still in the earth?—A. Yes, sir; that is my rec lection. I will look up the matter again.

Q. So that, down to the time of your being officially relieved from uty there and the time that Captain Symons took charge, no further nowledge as regards the character of the rock which was to contain his tunnel had been obtained?—A. No, sir.

Q. Did you approve of and coincide with these reports of Major Lyecker that you have already read?—A. As I understood them at the me, I did.

Q. Did you understand them at the time any differently to what you nderstand them now?—A. Yes, decidedly. I supposed that he had n view the fact that he had only ascertained the depth to bed-rock, and hat only approximately, along the line, and had found that the difficulty anticipated in shaft-sinking through soft materials—which was he very difficulty talked of at that time—would not be material or ubstantial, but that the initiation of the work and the exploration of the ock were part and parcel of it. I know that eight shafts, including ir-shafts at equi-distant points along the line, simultaneously sunk into ed-rock, would have made the exploration, which ought to have been ade as a part of the tunnel work.

Q. That you understood at that time, before you left the work, to be he very next thing to be done before they started the tunnel.—A. Unuestionably; it was the critical period of the work.

Q. And so had the matter been in your charge as an immediate oprator on the surface of the earth, the next thing that you would have one would have been to sink your shafts to the surface of the bed-rock, n order to explore the rock along the general line where the tunnel was o be?—A. Yes, thoroughly; either by sinking shafts to their dimenions, or, if that were thought undesirable, by boring with a diamond rill.

Q. Boring by diamond drill would have cost much less than sinking hafts?—A. Much less.

Q. And the result would have been just as good?—A. Just as good.

By Mr. DAWES:

Q. Would the drill reveal seams?—A. It will reveal seams by the reak in the core. Of course it does not cover the same area that a haft does.

By the CHAIRMAN:

Q. But it will disclose any difficulty of that kind?—A. Yes.

By Mr. DAWES:

Q. It will reveal every seam within the diameter of the bore just as erfectly as a shaft?—A. Yes.

By the CHAIRMAN:

Q. Can you explain why this preliminary boring, which you thought o important before the actual tunnel began, to be sure of your ground-as not made before Major Lydecker made his final report recommend, ng the final adoption of his plan?—A. I do not recall the reason, but think that his idea was that the principal difficulty was in getting own to bed-rock, and that surface indications were plausible presumpve evidence as to the character of the rock, if you went down deep nough.

Q. You evidently both had in your minds the circumstance that the hief of Engineers had given his provisional approval upon the distinct asis that it was to be ascertained that the character of the rock, where

the tunnel was to be, was to be known to be of the solid and sui character that you supposed it was going to be?—A. I think he sidered that that meant solid rock—bed rock.

Q. That is, if he went down into the earth anywhere and found rock, that was all that was required?—A. I think the idea was that was all the condition imposed on his project.

Q. Was that really consistent with the reports which you had to him, and which he had made to the Chief of Engineers, as reg the propriety of having the tunnel changed at all? Was it not upon the idea that it was absolutely dependent upon the charac the rock where the tunnel was to be located?—A. That was cert my idea of it.

Q. How could it have happened then, that this final report of Majo decker's, following the conditional approval of the Chief of Engi should have been made without ascertaining that fact, when it ap so clear, from Major Lydecker's reports and the approval of the of Engineers, that the very condition upon which the whole was forward as a work was the fact that it was to be ascertained in ad that the character of the rock where the tunnel was to be was suitable and of the description which you have already explained be necessary?—A. I know it was very clear to me all the time th such explorations had been made, and that if the project cou approved upon the statement of facts which could be presented, it be probably conditioned upon the assumption that the prelim work was the work of exploration of the interior rock. That wa fectly clear at the time, and I learned by accident that the tunne started; and, although it was none of my business, I went to Majo decker and told him that he was making a mistake.

Q. About what time was that?—A. On Sunday, March 2, 1884. On day I discovered accidentally that the tunnel had been started, i diately made a careful examination of the rock which had been th out, and found it to be unsound. Major Lydecker's order assig Lieutenant Symons to duty on January 3, 1884, excluded me from fu participation in the work, left me in ignorance as to its progress, a lieved me from all responsibility. Nevertheless, I warned Major Lyd that the tunnel was not being started in sound rock, and advised to sink the shafts deeper. My advice was disregarded.

By Mr. DAWES:

Q. Was that the March following your relief?—A. Yes, sir; the M following the January when I was relieved.

By the CHAIRMAN:

Q. This order to Lieutenant Symons had the effect to relieve yo A. Yes, sir. In fact I did not know that the tunnel had been sta and it had been in progress about two weeks.

Q. What did you do after Captain Symons came there?—A. I back to the District office, Major Lydecker intimating to me that was my duty. He has since then, in another investigation, discla any idea of relieving me, but the order speaks for itself. No mil man can read that order and fail to understand it.

Q. And that order, as a fact, ended your actual connection with A. Yes, sir; it operated to exclude me from the work.

By Mr. DAWES:

Q. And in point of fact you were from that time where?—A. I District office until the following August, and then I was sent to M gomery, Ala.

By the CHAIRMAN:

Q. Where was this shaft where the tunnel was started that you inpected and found the rock so bad?—A. I think it was Rock Creek and oundry branch. I found they had started a shaft at both places. It as some time ago, but as I remember it now the rock was bad, and early not the rock that was wanted.

Q. Did you at any time after that period see the nature of the rock the western connection?—A. Yes, sir; that is just where he ought have gone down to the very bottom.

Q. What sort of rock was there?—A. Absolutely as rotten as punk.

Q. And how far had the tunnel been carried from the shaft when you aw it?—A. The tunnel had not been started, I think, when I left.

Q. Had just got down to the bottom of the shaft?—A. The shaft was ill being cut in January, 1883.

Q. I am now speaking of the western connecting shaft.—A. It was tarted February 12, 1884, and completed June 23, 1884. I do not know hether I ever saw any rock taken out of the tunnel or not, because I id not go much on the work after that. I used to drive over occasionly on Sundays. But when they were sinking the shaft I saw the haracter of the rock taken out of the shaft.

Q. You may now state what your plan was, as regards any lining of he tunnel that you proposed, when you were connected with it. I see hat in the report that reference is made to some possible instance that ight occur where lining would be necessary. What was it in conmplation, if you had any plan, to do in regard to that lining? How as it to be constructed, and so on?—A. At the time of presenting the roject which Major Twining and myself designed, I do not know hether we had gone into the subject or not, but I think we had. I hink we had decided even then to use the excavated rock from the nnel in the form of a concrete for the lining. I know that was my lea all along, and that as Major Lydecker's assistant I proposed that.

Q. That is, to fill up all the cracks and crevices and render the angles nd all that sort of thing smooth with a plastic material which would ome flush with the outermost projection?—A. And which would penerate every cavity.

Q. Was it in your contemplation to bring that concrete in front of he most prominent projection in the tunnel, and if so, how far, if you nderstand me?—A. I think I do understand you, yes. It was inended to cover everything, so that the water-way should have a perct surface of cement.

Q. How did you expect to be able to make that cement set, assuming hat many of these crevices and cracks would have water coming in hrough them at the time?—A. Of course, wherever there was a strong flow of water it would have been necessary to give it special treatent, to provide an opportunity, by a tunnel in the rock, for instance, own the sides, or an open iron drain, with a valve fit into the inner xtremity of it, a valve which would open inward and close outward, allow free percolation during the construction of the work.

Q. So that you think it was reasonably and mechanically practicable have concreted even those places where the rock was jutting in ntinually?—A. Unquestionably. It has been done, as a matter of ct. It is not an experiment at all.

By Mr. DAWES:

Q. How could you, if there were 5 or 6 feet of vacant space above e crown of the arch, fill it up with concrete such as you have de-

scribed?—A. Fill it all up with stone and cement. In arching a t with brick, they use what they call a center, which is a semi-ci wooden structure, resting on the sides for support, and above fo 4 and perhaps even 5 feet, as far as they can reach in, coverin whole section of the tunnel, and the men move backward, always ing that way [illustrating] lengthwise into the tunnel to lay the and stone, or whatever the lining is, but when putting in plastic rial it would be done quite differently; then you have only m ribs to support movable boards, what they call lagging, and yo them up at the sides only. You can in that way work 100 feet at if you want to.

By the CHAIRMAN:

Q. What would you do if you found a cavity in the roof?—A. first place, suppose you have built up each side as far as you ca veniently for your man to get in and work, then you have a conti long aperture there—a sort of lane.

By Mr. DAWES:

Q. A slot, as we call it?—A. Yes, sir; a big slot above you that is to take the key. Then for a short distance you use the layers' method, with a short center across, as long as you can niently work there, and then you work backwards.

Q. Would you fill that with cement or stone?—A. With both.

By the CHAIRMAN:

Q. With concrete—small broken stone mixed with cement—s the whole is as immovable as if it was mortar?—A. Yes, plastic rial. At the last investigation I pointed out the failures of com lining wherever it has been tried; it has uniformly failed.

Q. You mean in other work?—A. Yes, sir; they tried it in the tunnel at Chicago, and Mr. Chesboro immediately abandoned it; the second tunnel they prescribed homogeneous lining. Also i Dorchester sewer tunnel at Boston homogeneous lining wa scribed and used. It is well known, and has been amply pro this work here, that two sets of men will not work together pr unless they are separated in their work so as to leave no chan fraud or laziness or idleness. Putting in this masking ring of seals all behind it, and gives the opportunity and the temptati men who are doing the work to neglect it. The theory was admi and in the Chicago tunnel they tried putting in this masking shel clay tamped against the natural clay at the sides of the excavatio is admirable in principle if you could get it put up, but Mr Ch found that it could not be put in properly, and so he abandoned i then made it solid. Only one class of workmen, the bricklaye the whole of it. Wherever the tunnel had not been cut to a tru tion there were places to be filled in, and all to be done by the class of men, and they were made to finish it as they went.

Q. What did they fill the cavities with?—A. Instead of maki brick shell of uniform thickness and leaving cavities behind it built it up solid as they went.

Q. Made it conform to the surface of the cut?—A. Yes, sir; tha all done at one operation, and then a man could watch them at work and see that they did it right. As long ago as the construc the first principal tunnel in this country they observed the impr bility of this composite lining—this masking shell, giving a cha putting nothing behind it. That was the Hoosac tunnel. The th

lining for an ordinary railroad tunnel not subject to internal pressure brick shell with dry stone packing. But Drinker, the great authority tunneling, says it is not practicable, because you can not make the do it, and you can not depend upon its being properly done. You w, Senator Dawes, how long ago the Hoosac tunnel was built, and e that principle was not used at all.

Mr. DAWES. I live within 2½ miles of it, and I ought to remember.

he WITNESS. Then you are familiar with it. They did not like to e a brick shell and seal it by counter-port walls where the rock was y bad, and so they put them close together; and where it was simply arge blocks and liable to fall, and could not be sustained in that , they put them further apart. But one class of men did the whole g, and they were the bricklayers, and if they came to a place where counter-port was going to be built they did not leave that for some- y else to do, but built it up in connection with the work they were n doing.

. Do you know, from your studies or experience or observation, how ceptible a mortar, made of the best cement that could be had, say man cement, for illustration, with the best sand, and in the best portion, and laid to a thickness of 6 inches and allowed to set per- ly, is to the filtration of water through it under a pressure, I will , of 25 pounds to the square inch, or any other pressure that you pen to know?—A. I do not remember any exact experiments, but eral Gillmore says that concrete can be made so dense as not to ab- water as rpadily as brick, nor permit percolation as freely; and all horities agree that whenever you want impermeability in hydraulic structions, concrete is the best construction, beginning with old eral Totten and coming down to our day—old authorities and mod- authorities all agree that concrete is the best material, whether you it as a vertical cut-off wall, or as a horizontal floor, or a gate-cham- , or anything else.

By Mr. MCMILLIN:

. You contemplated from the beginning that there would be points this tunnel that would require lining?—A. Unquestionably; I ught there would be some small proportion, but that generally the nel would be driven in rock and not require lining. For instance, tunnel in Baltimore was driven generally below the line of surface ntegration. Out of 7 miles of that tunnel it had 4½ that required no ng. Generally near the surface it required lining, but even then e points were found where none was required, and lower down, re they passed under the high hills and got down below the surface ntegration they found the rock sound, and it required no lining at

. You say composite lining has been abandoned by scientists every- ere?—A. I would hardly put it so strongly as that, but its inefli- cy is generally recognized. For railway tunnels it is generally l still, I believe, because there it is not so important.

. There is no internal pressure in that case?—A. No internal press- but for any work analogous to this it is definitely abandoned; at t it has been in every instance I have any record of. I have cited Chicago lake tunnels, and I have cited the Cleveland lake tunnel , as well as the sewer tunnel under Dorchester Bay at Boston.

By Mr. CLEMENTS:

. If it was considered bad for a work of importance, then what ld you think of dry packing?—A. I condemned it utterly at the last

investigation as being incapable of offering a rigid resistance internal pressure; it will yield. A board of engineers sustained that opinion, too. That was the principal contention that I ma was alarmed for the safety of the work at the last investigation laid almost all the stress of my testimony upon that point.

Q. What investigation do you allude to?—A. The report of m mony is found in Report No. 3109, Forty-ninth Congress, first s

By Mr. McMILLIN:

Q. Is it probable that the rock is sound within any reasonable there where that tunnel is?—A. I think the indications all poin

Q. At what depth would you say it would be found sound where the tunnel is now being constructed?—A. Of course I wou like to make even a guess in regard to that; I have always tak ground that I never would, and never did, guess at the depth of rock, but have always maintained and insisted upon finding it making any direction in the matter of lining. I think a pract feasible depth of that tunnel would be perhaps 400 feet. For in you could have lowered the grade 150 feet below the present gr an expense of less than $60,000.

Q. Would you not have increased the pressure so very gre that process that you would have made the lining there muc difficult practically?—A. Fortunately not. Upon that one pr depended the security of the structure. You will understand th internal pressure is the difference between the pressure of the wa side and the pressure of the ground water outside. Take the l the distributing reservoir and the constant level of the ground and you see the difference of level between those two is const matter where the tunnel is put. When the water in the distri reservoir remains at that level constantly, the difference betwe surface of the distributing reservoir and the ground water is the ure of the pressure on the interior of the tunnel. While you add head at the aqueduct, you also add to the head of the ground the same amount. For instance, supposing the difference in ele between the distributing reservoir and the elevation of the water is 100 feet; now your tunnel is down 50 feet below the g if you put that tunnel down 100 feet more it is true you add 100 the head from the distributing reservoir, but you add the same a to the ground water, and so the differences balance each other an the old difference as the resulting pressure inside. That was th feature upon which the execution of this thing depended, that an ing sound rock. If it had not been for that principle the incep the project would have been untenable.

Q. With that depth would you not have encountered great di ies in the form of sediment settling in the bottom of the tunn filling it up?—A. There would, of course, have been some am sediment, but the tunnel could have been flushed at any depth readily as a cast-iron main could. There is provision made for

By the CHAIRMAN:

Q. You speak of flushing to clear the tunnel of sediment. W your plan as to flushing?—A. You know that the surface of th both at Foundry Branch and Rock Creek is very much below draulic grade-line of the tunnel; so that you have a considerable ure there even at the surface of the ground. By putting down p the required diameter to the bottom of the shafts at Foundry

nd Rock Creek, and having a sump-hole there for the collection of the ediment, you can flush it just as you would flush an iron main.

Q. Would not the sediment accumulate in the various depressions of he grade of the tunnel?—A. It is not on one uniform grade, but at ach depression there would be some accumulation.

Q. And you think the flushing under the head you could get at Rock Creek, which is the lowest place, would be sufficient to carry out all hose accumulations?—A. My impression is that it would be sufficient. t has been some time since I looked into that matter.

Q. In submitting estimates at any time was any estimate submitted or flushing?—A. It was included in the general contingencies. The pecifications, for instance, required the contractor to adapt the shafts o their final uses as specified, though no detailed drawings were made when I left the work.

Q. There was no detailed or separate estimate for that?—A. No, sir; o separate estimate.

Q. Was any estimate made during your time for any pumping plant o free the tunnel from water in case of necessity, if such a thing should rise?—A. No, sir; I think not.

Q. Was that in contemplation?—A. It must have been in contemplaion the possible necessity for it. I do not think it was in contemplaion to provide a permanent plant of that character, but of course the ontingency must have been considered of requiring the pumping of it ut at some time.

Q. Would it not be extremely desirable that the means should be in peration ready to pump the tunnel out if it became necessary?—A. It ould be very desirable. My mind does not go back to it perfectly; ut I think I was under the impression that the high-service pump orks for Georgetown Heights and for the north part of Washington ity could be located, say, at Rock Creek, and made available.

Q. That they could be made available for clearing the tunnel, if necssary?—A. Yes, if necessary.

Q. You were on duty at the time the first contract was let to Beckwith & Quackenbush?—A. Yes, sir.

Q. Did you have any part in the examination of the various bids?—A. I think I had some in the arithmetical computations.

Q. Did you take any other part in it?—A. Yes; I remember one interview between Major Lydecker and Dewees & Co. at which I was present.

Q. What was that interview? State what occurred, please.—A. I do not remember much about it, but I remember that the substance of their proposal was discussed, and Dewees himself was present, I think, with ome one who was either a proposed surety or perhaps a partner. I on't remember which he was.

Q. Was he a gentleman named Johnson?—A. I do not recall the ame.

Q. Tell us what took place, as far as you remember?—A. As nearly s I can remember Dewees was questioned on the subject of his former xperience in work of this character, his plant and capital; but my recollection is very vague in regard to the interview. He was examined enerally upon questions suggested by his proposal.

Q. Was he asked whether he had been a contractor and operator in ock-blasting, tunneling, &c.?—A. I think he was; I think that quesion was discussed.

Q. Do you remember what his replies were?—A. No, not accurately. think I remember the tenor of his reply, which was that he had

not been engaged on any work of this character, and I think he
tioned a work at Hot Springs, Ark., where he had been employed
contractor, building a retaining-wall along the stream there, or s
thing like that.

Q. Do you remember whether he said anything concerning work
railways in Pennsylvania and Maryland, and so on?—A. He may h
but I do not recall it.

Q. You made some computations on all these bids, I suppose?
I think I did. At any rate I saw them, if I did not make them my

Q. Do you remember now enough of the character of those bi
be able to tell us which was the lowest upon the papers and proposal
A. I think Dewees & Co.'s bid was the lowest.

Q. Which was the next lowest?—A. I believe the present
tractors were the next lowest, but I am not sure.

Q. Do you remember the proposal of Eugene Robinson?—A.
I remember that.

Q. And you think Beckwith & Quackenbush were below that?
That is my impression; I may be mistaken, though.

Q. Gere & Co., of Syracuse, N. Y.; do you remember that nam
A. I recall that name, I believe.

Q. Cranford, of this city?—A. Yes; I remember that he was a
der.

Q. Archibald, of Washington?—A. I think I remember that n
too.

Q. And you think that Beckwith & Quackenbush were lower
any of the others, except Dewees & Co.—A. That is my recollecti
it now.

Q. Do you know upon what ground the bid of Dewees & Co. was d
garded and the Beckwith & Quackenbush bid accepted?—A. Only
generally; I knew nothing more than my impression derived from
interview with Major Lydecker. The papers in the case did not
through me to award, but I can give you my impression at that
derived mainly from that interview; that Dewees & Co. were rega
as not being responsible bidders, not having the requisite exper
or capacity or plant or capital, possibly. I know this, and I thi
ought to state it; I had never had any reason then to suppose that
improper motive influenced the award.

By Mr. CLEMENTS:

Q. Do you know any other reason why Dewees & Co. were no
garded as responsible bidders except what was disclosed in that i
view with Dewees?—A. No, sir; I do not. I believe that is absol
the only connection I had with the whole affair of the award. I
present at the opening, and either prepared or assisted in preparin
comparative statement, or at any rate saw it at the time; and th
was present at this interview with Dewees.

Q. You do not know of any investigation that was made othe
than in that interview with him by Major Lydecker.—A. I do not r
any.

Q. As to his responsibility?—A. Perhaps if anything else
brought to my attention I might, but my impression is strong that
is all I had to do with it.

By the CHAIRMAN:

Q. If there is anything else you wish to say in regard to your co
tion with the affair or matter itself, you are entirely at liberty to
it.—A. Thank you very much. You have questioned me so thorou

t I think I have gone nearly over all the ground. I was just hesiing whether I should ask your permission to append a couple of short ers here which may repeat some of my testimony, but I have prered them in a very condensed form from the official records, concern my connection with the work.

The CHAIRMAN. We will receive them for consideration if you would e to leave them with us.

The WITNESS. I would like to have them, if possible, made part of testimony.

Captain Hoxie then submitted to the committee a paper prepared by nself as his consecutive statement in regard to his connection with tunnel matter, and the same was received by the committee for conration, and marked "Capt. R. L. Hoxie's Statement, submitted Deber 20, 1888."

TESTIMONY OF LOUIS E. JOHNSON.

FRIDAY, *December* 21, 1888.

LOUIS E. JOHNSON, sworn and examined.

By Mr. FAULKNER:

Q. Will you state your residence?—A. Washington, D. C.

Q. What connection, if any, did you have with the letting of these ntracts for the construction of the tunnel and for the water supply of city of Washington?—A. I represented the party, Dewees & Co., I ng one of the company. My portion of the work was to attend to correspondence and to argue points before the Secretary of War, l General Wright, the Chief of Engineers of the Army; also, in e they should attempt to place excessive bonds upon us, that I uld attend to that in the city of New York, through my brother in-, William R. Travis.

Q. Were you connected with this matter prior to the letting of the ntracts?—A. Yes, sir; prior to the bids being put in.

Q. That was subsequent to the advertisement, I suppose?—A. Yes,

Q. Did you have any conversation with Major Lydecker with refer-ce to the letting of contracts?—A. No, sir; I never saw Major Lycker, but I went to his office and delivered a communication, which I ew up, and of which I have here a copy. This is the copy that I livered in person at Major Lydecker's office on Four-and-a-half street roducing paper].

Q. To whom did you deliver that in his office?—A. To a clerk in the ice; that was between 3 and 4 o'clock on the 19th of October, 1883. reads in this way:

WASHINGTON, D. C., *October* 19, 1883.

IR: Having reason to believe that we are the lowest bidders upon the bulk of work upon the Washington aqueduct, we hereby respectfully notify you that we prepared to furnish all necessary bonds and money, as per our bids and specifica-ns, which you, in your wisdom, may require.

Very respectfully,

J. H. DEWEES & Co.,
1701 *Boundary street, Washington, D. C.*

Maj. G. J. LYDECKER,
Engineer in Chief.

Paper furnished Major Lydecker by Maj. L. E. Johnson, October 19, 1883.

Q. Did you deliver that paper after the opening of the bids or p
to that time?—A. After the opening of the bids.

Q. Were you present at the opening of the bids?—A. No, sir;
office of the engineer was on Four-and-a-half street at that time.
bids were opened at another office, just as you reach Georgetown;
across the bridge.

Q. Do you know of your personal knowledge whether that letter
ever received by Major Lydecker?—A. I do not.

Q. With whom did you have any conversation in reference to the b
Dewees & Co., subsequent to the opening of it?—A. After the
were opened, on the same day or the next day, we were persuade
convinced that we were the lowest bidders, certainly upon the tun
but not on the aqueduct and the dam. My first communication or
versation with anybody on that was with the Engineer in Chief, G
eral Wright.

I carried a communication addressed to the Secretary of War,
before going to the Secretary of War I called upon General Wri
I gave him the letter. He read it, and told me that the papers in
erence to the contract had passed through his hands to the Secret
of War, and that I would have to see him upon the subject I told
that I thought it was rather remarkable that the contracts should
given to the parties some $82,000 higher than ourselves, when we st
ready to give all the necessary bonds that the Government requi
Well, he said they passed through his hands; that he had said
Major Lydecker, when he (Lydecker) made a report to him (Gen
Wright) on the subject, "Young man, you take a grave responsib
on your shoulders in giving the contract to parties $82,000 higher t
the others." But he said, "Major, of course we are to a certain de
dependent upon our subordinates for reports upon points of this k
but I have forwarded it to the Secretary of War for his action."

That was my first interview with General Wright. I had another
with him a few days thereafter, in which I made a proposition to
that a commission should be appointed, of any number he would na
one-half of whom he should appoint as Army engineers, and the o
half I should appoint as civil engineers, and that if in thirty min
I could not convince them that we could make money upon our
we would retire and say nothing more upon the subject. He said
was a question for the Secretary of War to decide. On that occa
I think he said: "You gentlemen are to be congratulated in not ha
received this contract. I am informed that the parties that had
contract for tunneling under West Point—it cost them $9 a yar
drive the drift." I said, "Yes, General Wright; but you forget
thing, and that is, that the geology up there is very different from w
it is in this section of the country, and that is where you engin
made a grave mistake;" because Colonel Dewees had told me that
decker and Hoxie evidently had not studied the geology of the coun
and that at least seven-eighths of that tunnel would have to be li
and we would make the most of our money on the lining.

Q. Was that all the conversation with General Wright?—A. T
is about all I can recollect now, Senator.

Q. Did you go to the Secretary of War then?—A. Yes, sir.

Q. Did you see him personally?—A. Yes, sir.

Q. What conversation did you have with him?—A. I handed
the communication I had. He read it. He said, "Mr. Johnson, I
afraid you are a little too late." I said, "Why, Mr. Secretary?" He t
said, "The tail of that dog has gone through the hole in the fen

"Well," I said, "Mr. Secretary, the contract has not been consummated, and all that you have got to do is to take your hand, put it through the fence, take the tail of the dog, and pull it back." "Well," he said, "I don't know whether I will or not." Said I, "That means you will not." "Well," he said, "I don't know." That was on the first occasion. Then I saw him once again, and then I asked him for Lydecker's report against ourselves and in favor of Beckwith & Quackenbush, so that I might be enabled to reply to all the points that were made against us. On that occasion also he said he didn't know whether he would give me that report of the engineers or not. I said then, as I had before, "That means you will not." He said, "I don't know." But he never did.

Q. Did you ever have any further conversation with him?—A. No, sir. I saw him twice. That was only two occasions.

Q. Do you know whether Major Lydecker knew that you were representing Dewees & Co. at any time during the pendency of this bid of Beckwith & Quackenbush and before it was accepted?—A. No, I do not, except what he might have heard himself from the Chief of Engineers and the Secretary of War.

Q. Do you know whether the firm of Dewees & Co. ever called upon Major Lydecker with reference to demonstrating their ability to perform the provisions of this contract?—A. Colonel Dewees told me that they had sent for him, and that he had had an interview with them one morning, I think; and that all the persons present were Major Lydecker and Captain Hoxie, and that they examined him in reference to——

Q. You need not state what Dewees told you.—A. He had an interview with them. They notified him in writing.

Q. Who composed the firm of Dewees & Co. at the time this bid was made?—A. J. H. Dewees, a party by the name of Evans, and another one by the name of Brummall, and myself.

Q. What would you estimate that firm to have been worth—the value of their property, or of the individual members of the firm, or the assets of the firm—at that time?—A. The assets of the firm, from what I could judge in those days, were worth about from $85,000 to $100,000.

Q. Did you have any arrangements made to give the bond that was required?—A. Mr. Dewees informed me that he had an arrangement in this town to the amount of $100,000, if necessary; but beyond that I would have to attend to through Mr. Travis in New York, which I agreed to do. We were fearful that they might ask $300,000 or $400,000 bond.

Q. Will you state whether or not Mr. Travis had actually agreed to become bondsman, if necessary?—A. No, sir; he had not.

Q. You had not made application to him?—A. No, sir; but he had always gone on my bond heretofore.

Q. Do you know, of your own personal knowledge, whether Mr. Dewees had actually made arrangements with the parties in this town?—A. Only from what he told me.

Q. Only from his own statement?—A. Yes, sir.

Q. Do you know who represented Beckwith & Quackenbush at the time this contract was given out?—A. No, sir; I do not.

Q. Who was in the city on or about the time this contract was given out, and connected with the firm of Beckwith & Quackenbush?—A. Well, I didn't know any of them; I heard that one of them was in town, and a day or two before the contract was let Lydecker's father

arrived at Willard's, and was at the White House once or tw
saw him go in there once.

Q. Saw whom go in?—A. The father of Major Lydecker.

Q. Whom was he with?—A. He was by himself when I saw

Q. Why do you bring in the father of Major Lydecker as g
the White House? What connection had he with this busine
His connection was simply this: Beckwith & Quackenbush were
of Major Lydecker's father, and our information was that he c
here in the interest of Beckwith & Quackenbush.

Q. Have you any facts on which to base that information, oth
the fact of his being a friend of Beckwith & Quackenbush in th
of New York?--A. No.

Q. How do you know that he bore that relation of friendshi
firm of Beckwith & Quackenbush?—A. That was the repor
heard it at Willard's.

Q. Then your inference was drawn simply from that repo
Yes, sir.

Q. Without any other facts to base it upon?—A. Correct.

Q. Do you know anything further in reference to the givin
this contract that you have not stated and which you desire to s
A. No, sir; I don't think I know anything further. I merely de
these communications in person.

Q. I will ask you further: Did the firm of Dewees & Co. h
plant, at the time they made this bid, with which to excav
tunnel?

The WITNESS. At that time?

Mr. FAULKNER. Yes.

The WITNESS. No, sir; but had made arrangements to h
though they did not have any on hand at all.

By the CHAIRMAN:

Q. You say that arrangements were made to have a plant?—
Dewees told me he had made arrangements with parties who
plant.

Q. Did he tell you who the parties were?—A. The name I h
gotten now.

By Mr. FAULKNER:

Q. Do you know whether it was a Chicago firm?—A. No, si
not.

By the CHAIRMAN:

Q. You can not recall who he said it was?—A. Not now, I c
I have one paper here; I don't know whether you have a copy
not. It was one of the communications I delivered to the Secr
War with the record of Col. Dewees in reference to former work
had done.

Q. At what time did you deliver that paper?—A. This pap
written on the 29th of October, 1883, and I think was delivered
day or the next.

Q. Was that before or after the Secretary of War had appro
contract with Beckwith & Quackenbush?—A. The first one
the 22d of October; this is the second communication. The
were then in his hands and had been sent to him by the Chief
gineers, General Wright.

Q. And were yet unacted upon, so far as you know?—A. Y
our impression was that he had given it out privately, but it h

en published, and so I asked him to fill out the paper, and I would pear and argue the point as regards our ability. Shall I leave this per with you?

The CHAIRMAN. If you like you may do so. We very probably have e same paper from the Secretary of War, unless it has been lost, as asked the Secretary of War for all the papers bearing upon the sub-ct.

TESTIMONY OF G. J. LYDECKER—Recalled.

FRIDAY, *December* 21, 1888.

Maj. G. J. LYDECKER, recalled and further examined.

By the CHAIRMAN:

Q. I would like to ask you one or two more questions in regard to the ting of the contract and in regard to not awarding it to Dewees & ., as we have further information that will enable us to ask some estions that did not occur to us before, at least did not occur to me, believe. I think you stated before that Mr. Dewees was present at e opening of the bids?—A. Yes; I saw Mr. Dewees after the opening the bids, I am very sure; I can only state from recollection.

Q. Did Mr. Dewees tell you what his history had been, or some part it, as regards being engaged in tunnel work, railroad work, etc.?—I have no recollection on that point, of his referring to any tunnel rk or anything of that kind. As nearly as I can recollect, all that s said about work that he had been doing was that he referred to a sition that he had held somewhere about that time as superintend-t of construction, I think at Hot Springs, Ark., some work of that scription. That is a very indistinct recollection I have on that point.

Q. You do not remember that he referred to any public work, or lway work, or tunnel work that he had done in Pennsylvania or aryland?—A. No, sir; I don't recall it in any sense; I do not recall ything of that nature.

Q. Did you ever hear of or see a paper filed by his counsel, or by me one on his behalf, whatever relation he bore to Mr. Dewees, by r. Johnson, or anybody else, with the Secretary of War before the ntract was awarded, showing what Mr. Dewees was?—A. No.

Q. And what experience he had had in public works, etc.?—A. No; ave no recollection of ever seeing or hearing of such a paper.

Q. Did you at any time have any conversation or discussion with e Secretary of War on the subject of Mr. Dewees?—A. I have no ubt that I did. I have no doubt that the question was discussed both tween myself and the Chief of Engineers and the Secretary of War, cause the whole subject of plant and letting was the subject of frequent nversation between us, I know, before it was finally decided.

Q. Do you remember what that conversation was?—A. No; I can t recollect any further than I have stated in my letter explaining to e Secretary of War what my reasons were for making the recom-endation. So far as I can recollect, there was nothing said at that ne pertinent to the affair except what I have just stated.

Q. Do you remember now whether or not Mr. Dewees informed you at he had made arrangements with parties in this town to furnish all e money, a large amount of bonds, to the extent of $100,000 or some her sum?—A. He may have stated something to that effect, but I do t remember it; I have no recollection of such a statement.

Q. Do you remember any conversation with General Wright upo subject of Dewees?—A. No, sir; General Wright at that time was of Engineers, and I may have talked with him, as well as the Secr of War, but I have no specific recollection as to any special poin was touched during the time.

Q. Do you know whether or not General Wright hesitated doubted in regard to the propriety of the contract being award Beckwith & Quackenbush, in view of the other bid or bids?—A. there was a general hesitation on the part of all of us in regard to r ing the lowest bid, considering the difference in amount between two, and that was the general topic of conversation as to what wa proper course in the case. I do not think there was any questio the next point of award, that is, after passing the question of the l bid.

Q. Then the real point in your conversations with General W was whether there was any just ground for refusing to accept th posal of Dewees & Co.?—A. Yes, to the best of my recollection; was the material point under discussion during all that time.

Q. That being the material point, will you not repeat, accordi the best of your present recollection, the substantial grounds stated to General Wright, advising him that Dewees's bid ought not recognized?—A. There were several occurrences—I can not recall now—that excited my suspicions as to these bidders. The adve ment required in the beginning, before obtaining blanks for prop that they should each present prima facie evidence of their capaci the work, as to experience and financial capacity to undertake the and therefore that they should call at the office and secure the bid examine in detail all the plans and go over the ground.

Q. That secured their blanks?—A. Yes, that secured their bl These blanks were not obtained in that way at all, as I recollect i they were obtained through third parties.

Q. Do you know who the third parties were?—A. No, sir; I remember now.

Q. Did all the other bidders come to the office and get their blan A. To the best of my knowledge they did, so far as the subjec brought before me. Of course there are a great many of those made at the office of which I have no personal knowledge.

Q. Then how do you know that Dewees did not get his blanks a office?—A. It was so reported to me, I think, by Captain Hox whoever it was; I can't state who reported it to me, but it was rep to me as a fact.

Q. You would not be willing to say it was Captain Hoxie, v you?—A. I could'n swear that it was he; no, sir.

Q. Do you believe it was he?—A. I think it was; the best recollection is that it was he.

Q. Have you any present impression in your mind as to who i that told you that?—A. I think it would be mainly guess-work.

Q. Merely guess-work?—A. Yes, sir; there were several person nected with the office at that time.

Q. At what time were you told this fact, if it were a fact, tha wees had not got his blanks at the office in the regular business wa A. In all probability at the time the bids were opened and after were abstracted. If I am not mistaken, there was a record of the p given out, showing to whom given, and the name of this firm di appear on the record. Whether it was preserved as a matter of r or not I can not say.

So that if such a record or paper existed at the time it might not now?—A. If it was only a memorandum; but if it was made as a anent record it should be there in the office. That did not occur until this moment.

e CHAIRMAN. We have called upon the Secretary of War and upon you for every paper that existed that bore upon this subject y of its aspects. I should like you to be ready to testify, the next you appear before us, whether you have searched and whether ave given us all the papers we have called for, and particularly ner you have been able to find any such paper as that.

Do you remember whether, while this matter was under consid-on and before the contract was awarded and about the time that ids were opened, of receiving a communication in writing from De- & Co. upon this subject?—A. No, sir; I do not think that I ever any communication from him on that subject in writing; to the of my recollection, I did not.

Where was your office at that time?—A. I had two offices, one at the office of the District Commissioners and the other at the getown Aqueduct office.

At that time your office with the District Commissioners was on and-a-half street, I suppose?—A. Yes, sir.

Who were the clerks in charge of your papers and in receipt of letters at Four-and-a-half street?—A. The official letters addressed there, if they were addressed to me as Engineer Commissioner, ally came to the office of the Engineer Commissioner, and were ed by Mr. Rock, the chief clerk, and briefed.

Was there any other clerk there?—A. Oh, yes; there were sev-other clerks there in connection with the office.

But the chief clerk would be in charge and would naturally be erson to whom any official communication addressed to you would nded?—A. I presume so.

Even if somebody came in and handed it to some other clerk, that clerk would pass it to the chief clerk in the ordinary course of ess, I suppose?—A. Yes, sir.

Who was your chief clerk at the other office, over in Georgetown?—r. Simon Newton.

Now, in order to refresh your recollection, let me ask you if you ot receive, on or about the 19th of October, 1883, a letter reading s way:

WASHINGTON, D. C., *October* 19, 1883.

G. J. LYDECKER,
Engineer in Chief:

Having reason to believe that we are the lowest bidders upon the bulk of the upon the Washington Aqueduct, we hereby respectfully notify you that we are ed to furnish all necessary bonds and money, as per our bids and specifications, you in your wisdom may require.

Very respectfully,

J. H. DEWEES & Co.,
1701 *Boundary Street.*

I have no recollection of that letter.

Where were the letters kept that related to these bids?—A. They d all have been put in the Washington aqueduct office, at the ng of Pennsylvania avenue and Rock Creek, or rather M street, d of Pennsylvania avenue; the office is in the first house beyond idge.

What would be the number?—A. It is the first house beyond the e: I really do not know whether there is a number to it or not.

Q. Have you any recollection of receiving any communicatio
ing at all from them, or which purported to come from them
this date I do not recollect it at all; my only recollection is of
view with Mr. Dewees.

Q. If any such paper came to your office as this I have desc
the paper of which this purports to be an identical copy, shou
have been preserved as part of the files of the office?—A. I
have been preserved, and ought to have been forwarded
papers that have been sent here.

Q. Perhaps it has; I have not looked through. You then
seen any such paper recently?—A. I do not recollect it an
papers that I have seen recently.

Q. If the very point was, as you say, regarding Dewees & C
bid being evidently the lowest, to consider whether it ought
jected, why can you not remember receiving a communication o
portant and formal character from them, when that very sub
under consideration?—A. I presume that if a letter of that k
received, it did receive the attention that I believed at the ti
served.

Q. You can not recall anything about it?—A. I can not re
thing about it, but I know that I would give it the attention
my opinion, it would have merited at that time.

Q. Do you remember laying any such letter before General
or communicating its contents to him while you were discus
question whether Dewees & Co. should be passed by and Bec
Quackenbush accepted?—A. No, sir; I can remember nothi
it in that sense. I believe that the letter which I communicat
Chief of Engineers, reciting substantially my reasons for recom
the rejection of the lowest bid, contained all that I substantia
on the subject at that time; I think so.

Q. Do you remember General Wright telling you at any tim
nection with that, or in reference to this business, that you wer
ing a very grave responsibility, or some kind of responsibility,
this contract to a person who was by so large an amount a bidd
than the lowest?—A. I think it altogether likely that he m
cautioned me in that way, because he was inclined to take all
guards that he could and aid his officers the best he could aga
undue haste of that kind.

Q. Do you remember that he did say to you anything of
that I have mentioned?—A. No, sir; I can not remember that
I simply know that the matter was the occasion of conversatio

Q. Upon what ground, finally, as you understood it at the
General Wright accede to your recommendation that Dewe
should be rejected and Beckwith & Quackenbush taken?—A.
belief that Dewees & Co. were irresponsible contractors, and
developed or established in any way or shape before the Dep
their capacity to do the work upon which they bid, and that i
the interest of the Government in the end that we should sta
firm of contractors who were considered to have a better s
both financially and practically, and with plant and machinery

Q. I think you stated in your former testimony what steps
to ascertain the responsibility of Dewees?—A. Yes; so far as
recollect at that time.

Q. Can you recall anything further at this time, after the m
been through your mind?—A. No, sir.

Q. Did you ever hear anything of a letter addressed to t

y by Dewees & Co., later than the one that purports to have been
t to you on the 19th of October, and dated about the 30th of Octo-
and while the matter apparently was under consideration by the
retary of War or was somewhere in progress?—A. No, sir; I recall
e.

Q. You do not remember anything about that?—A. I do not remem-
anything about that. I have no recollection of any paper either
ng spoken of there or being sent over from the Secretary's office for
ort, or anything of the kind.

Q. Have you answered my last principal question, which was, what
s the substantial ground, as you understood it, upon which General
ight approved your recommendation against Dewees?—A. Yes, I
wered that; that it was the belief I entertained that they had not
nished sufficient evidence of reliability or capacity either financially
practically to carry out the work to warrant us in assigning such a
ge contract to them under the circumstances.

Q. Was any part of the consideration of that matter and its decis-
based upon the idea that their bid was too low and that they could
ke no profit, and would therefore fail in it?—A. No, sir; I think not.

Q. You said in your testimony formerly, if I recollect correctly, in
stance, that from your conversation with Dewees you were unfa-
ably impressed, and that you made up your mind that he was not a
lly responsible bidder, from his conversation with you, and the ques-
ns you asked him and the answers he made.—A. Substantially that;

Q. Did you ask Dewees in that conversation, or any other conversa-
n you had with him upon the subject, who his backers were?—A. If
id I have forgotten it. I can simply say in a general way that I
e no doubt that I took the same care in making inquiries in relation
hat that I had done in connection with other contracts before that
e, before making any recommendation.

Q. Whom did you inquire of in relation to Beckwith & Quacken-
h?—A. That I do not know either. I became satisfied that they
e men who were doing a big buisness of that kind and had an ade-
ate plant.

Q. What satisfied you of that?—A. I can only state what I heard at
time. I do not remember what specific person it was that gave me
t information.

Q. You do not remember from whom you got it?—A. No, sir.

Q. I think you stated before that you had never known Beckwith &
ackenbush before.—A. I had never known them individually at all;
never seen them.

Q. Had you ever heard of them before?—A. I think it is possible I
ght have heard of them as contractors.

Q. My question was whether you remember to have heard of them?—
I do not remember.

Q. Do you not know whether or not you remember now whether you
r heard of them?—A. No, sir. What I mean is that I can not say
v whether at that time I had actually heard of them before the ques-
n in regard to the contract came up.

Q. But at this present moment of time you have no recollection on
subject, whether you had or not; is that what you mean to say?—
That is what I mean to say.

Q. Did you tell Mr. Dewees in this conversation, to which I have re-
red, that you doubted his responsibility and that you were not satis-
with the explanations he had given of himself, whatever they

were?—A. I can not say whether I did or not; I can not possibly the conversations that we had in detail that way. I can simply r ber the general result, the general effect of it. I think I must ha him at the time, but I can not say whether I actually did or not

Q. Was there, to your knowledge or belief, any person, either ing here or residing elsewhere, present during the considera these matters as to Dewees, or during any part of the time of t sideration of those matters, in any way, acting or speaking in fa Beckwith & Quackenbush for the contract?—A. No, sir; I am p on that point. I am very positive that Beckwith & Quackenbus at no time specially spoken of in connection with the award or t ting of the bid. To the best of my belief and recollection nobo consulted or had anything to say excepting the parties immedia interest, the Chief of Engineers, the Secretary of War, Captain and myself. My recommendations to the Chief of Engineers wer after full and free consultation with Captain Hoxie, who had l the immediate and active charge of all matters relating to the of the bids and work, and I discussed fully everything with him lation to all those matters, also with the Chief of Engineers an the Secretary of War when called upon by him to do so. But of those, I have no recollection of a word being passed with an person, and I am confident there was none.

Q. Did you hear of any other persons being in Washington in tion with the subject than those you have spoken of?—A. None ever.

Q. What time did Captain Hoxie cease his connection with the w A. Shortly after the active operations commenced on the contra about the 1st of January.

Q. Was it on the occasion of Captain Symons being assigned to d A. Yes; about the early part of 1884, if I remember rightly.

Q. At that time how far down had any of the shafts been sun They had only started; they hadn't gone to any considerable The application for the detail of Captain Symons was made on the that now, that active operations were to be commenced, neither C Hoxie nor myself, in view of our other duties at the other office give that immediate and active supervision of the work which quired.

Q. Now I want to go back a little, to the approval, by the C Engineers, of your plan, and I want to call your attention to the General Wright's approval of your scheme of a continuous tunne conditioned upon the rock being found suitable; that is the sub of it, I believe?—A. Yes, sir.

Q. Then you reported to him later that you were satisfied that suitable?—A. Yes, sir.

Q. Now, I want you to tell the committee particularly and in exactly what you had done in that respect after you had found o it was suitable, so that we shall exhaust that matter.—A. That be impossible for me to recall at this moment. Every step th taken is detailed in full in a report made to me by Captain Hox that is printed in the annual reports. The question of those ex tions was remitted to him, and he had active charge of the mana ond had been engaged in examinations of the rock before I cam He made a report to me, in which is detailed all of his examin and that gave me the basis for my recommendation. That w foundation for my recommendation. That report consisted, as lect now, of a statement of the result of sinking his trial shaft,

capitulation as to the extent or the position and character of rock as determined from well-diggings at different points along the line, of outcroppings and developments in connection with the construction of sewers, and numerous instances of that kind connected with the work that had been under his immediate observation. However, they are all detailed in that report.

By Mr. DAWES:

Q. Will you state in this connection the extent of your own personal and actual knowledge, derived from experiments, as to the quality of the rock?—A. The knowledge I have is derived from having gone over the line with Captain Hoxie and having had pointed out to me by him the points at which he had made these observations.

Q. That is how you got your personal knowledge, but what was it; what did you know, of your own personal knowledge, when you communicated to the Chief Engineers that you were satisfied that the rock was of the quality required?—A. I had seen specimens of the rock from most of the points, which led me to the belief that the rock was solid.

Q. Had you seen the places from which the specimens were taken?—A. Yes, sir.

Q. Where was any specimen taken from which contributed to your judgment?—A. From Howard shaft.

Q. There was a specimen of rock which contributed to your conclusion which came from that shaft?—A. Yes, sir.

Q. Did you know, of your own personal knowledge, from where that specimen came; in other words, did you go to the spot yourself from where that specimen was taken?—A. Oh, yes; it was taken from the top of the shaft.

Q. You went to the spot?—A. Yes, sir.

Q. Where was that piece of rock taken from which contributed to your conclusion?—A. It was taken from a pile of rock that came from the tunnel shaft at Howard University.

Q. How far had the tunnel shaft penetrated the rock before the specimen was brought out; that is to say, at what depth of rock was the specimen taken from?—A. I have no recollection. I saw several specimens. I saw rock taken from different points, down to the limit to which the shaft was sunk.

Q. You did not yourself go down into the shaft to see how far that shaft had penetrated the rock before the specimen was taken out?—A. No, sir.

Q. Are you quite certain that it had penetrated the rock at all?—A. Oh, yes; I feel confident of that.

Q. How many feet?—A. The number of feet that were reported to me by those in charge of that work.

Q. My inquiry was the number of feet?—A. I do not recollect; I never made the measurements myself.

Q. Then you do not know from any personal knowledge of your own from what depth the rock specimen which was presented to you came?—A. Not by any measurements taken by myself; no, sir.

Q. At any other point have you any personal knowledge of any experiments that were made?—A. Yes; I saw a well that was being sunk.

Q. At what point?—A. That I do not know; on Eighth street extended, I think was the place; and a well was being sunk under the direction of Captain Hoxie when I came here.

Q. How far down had the well gone?—A. I do not remember.

Q. How far into the rock?—A. I can not tell you, sir, at prese
Q. Did you know at the time?—A. I think I did; I presume
Q. But it has escaped your mind?—A. Yes, sir; I had a great
things at that time, with my functions as engineer Commissioner
District and these other duties, to attend to. Those matters we
ported to me by those who had immediate charge of them.
Q. Do you mean to say there was any reason, in the multiplic
your duties, for your making anything but a perfect examination b
you reported?—A. I mean to say that I had to rely upon the inte
and efficiency of my assistants for my official action.
Q. Then your recommendation was not made upon any personal k
edge, but upon your confidence in your assistants, and on such per
knowledge as you could obtain?—A. I was responsible for every p
work in the District at that time, as the administrative head.
Q. Was there any difficulty, except want of time, in going to th
tom of every shaft before you expressed your conclusion?—A. No
not that I know of.
Q. Did want of time prevent you going to the bottom of these shaf
A. Want of time did not prevent me going to the bottom of
shafts, and I did go to the shafts.
Q. Then there was no reason why you should not know from per
knowledge where the rock on which you based your conclusions
from?—A. I believe I did know from personal knowledge where
came from.
Q. I understood you to say that you did not know.—A. I said
did not go to the bottom of the shafts, but I did have that confi
in my assistants, and particularly Captain Hoxie, that when he bro
me a rock from any shaft and told me where it came from, I had a
to believe it.
Q. I do not ask that; I only asked your personal knowledge.—A
personal knowledge was all that I could get possibly by day and
work; I did all I could stand in those days.
Q. Had you any personal knowledge derived from any other
except the Howard University shaft and that well?—A. No fu
than the same personal knowledge that I obtained by going to th
ferent shafts and having them pointed out to me, and from the
ments from Captain Hoxie that at those points we had such and
rock, though we did not enter the shaft.
Q. Was this communication from Captain Hoxie, which you h
much confidence in as to base your recommendation upon, given
before Captain Hoxie was relieved or after?—A. Before.
Q. Do you know of any other point at which you examined the
that had been taken out?—A. I went from one end of the line t
other.
Q. I want your present recollection of any other point.—A. I
no specific point in mind now.
Q. Would the pieces of rock shown to you on the surface disclo
you whether there were seams in the rock below from which
pieces were taken?—A. No, sir.
Q. Had you any data then—not having gone to the bottom your
from which you could come to the conclusion whether the rock was
or had seams in it?—A. There were none as to which I could stat
solutely that there would be rock without seams in it, of course, no
I expect to go through and find that the rock had no seams in it.
A. Are you quite sure that the rock had been penetrated at all a
place when Captain Hoxie was relieved?—A. Oh, yes.

Q. It had?—A. Yes.
Q. At what point?—A. Let me go back, Senator, for a moment. You
when relieved; do you mean when relieved from duty here in Wash-
ton?
Q. I mean when relieved from duty here?—A. The only rock that had
en penetrated at the time he ceased active work on the tunnel was
e rock at Howard University shaft.
Q. That was the only one that had been penetrated?—A. That is the
st of my recollection now.
Q. Are you quite sure that it had been penetrated at all there at the
ne he received your order putting that work under Captain Symons?—
I am as sure as I can be from his specific and exact reports to me
d the reports of monthly operations.
Q. Did Captain Hoxie communicate to you the condition of the rock
that time after that order relieving him, or were all his communica-
ns before that time?—A. All of his communications were before.
Q. Then he could have communicated to you no facts about the con-
ion of the rock beyond surface indications, except at Howard Uni-
rsity, if that was the only place?—A. That was the only part he had
ened.
Q. Can you tell how much below the surface of the rock the rock had
en penetrated before the specimens were brought out that you exam-
ed?—A. No, sir; I couldn't tell.
Q. Whether it was 5 feet or 50 feet?—A. It was not 50, but probably
was more than 5.
Q. Was that the basis of your communication to the Chief of Engi-
ers, that the rock satisfied the conditions?—A. The basis of my report
s as stated in my report distinctly.
Q. Can you tell me the several conditions upon which you based your
nclusion that the rock satisfied the conditions?—A. The examination
some reports or writings in connection with the subject of rock around
re was one element I remember; what reports they were I could not
w state without referring to my books. I think they are mentioned
my books. But specifically the result of the examinations made by
ptain Hoxie and stated in his reports to me serially, as to each of
e points, was the basis of my recommendation.
Q. I understand that Captain Hoxie had no knowledge of anything
t surface indications when he left, with the exception of Howard Uni-
rsity.—A. They were largely from surface indications and from the
lls he had examined, as reported to me.
Q. And whether he had any knowledge of the internal condition of
e rock at Howard University depends upon the fact as to whether it
d been penetrated at all before he left?—A. He reported that he
d penetrated and found it solid.
Q. Was that report in writing?—A. Yes, sir.
Q. Can you some time call my attention to his report made before he
t, stating that he had penetrated the rock at Howard University and
nd it solid?—A. Yes, sir.
Q. And I wish you would also find out how far the rock had been
netrated at Howard University shaft before he was relieved. Is
ere any other condition which contributed to your conclusion which
u can now communicate?—A. No, sir; my recollection is that I com-
nicated with the Department, and gave to the Department substan-
lly all the light I had to guide my own judgment. It was my effort
make it as complete as possible.

Q. Then your report was founded wholly upon the representatio
Captain Hoxie and others?—A. Substantially, and the informati
derived from them.

Q. After you had begun the work of tunneling did you have
conversation with Captain Hoxie about the character of the rock?
We must have talked on the subject; I have no doubt we did.

Q. Can you give us the character of the conversations?—A. I hav
indistinct recollection of talking to him about the necessity of g
down deeper in some parts than we had thought necessary in the
ginning.

Q. Was there any conversation between you and him, after you
commenced tunneling, upon the question as to whether the rock
been thoroughly tested at the west end, for instance? You bega
the west end, did you not?—A. We began at several points very ne
simultaneously.

Q. You were at work early at the west end?—A. Yes, sir.

Q. In reference to the disclosure of the character of the rock a
west end, if you had any such conversation with him, what was it?
I do not remember whether I had any conversation with Captain H
on that subject, or whether it was with Captain Symons, or both;
I remember that there was a discussion as to the propriety of tur
the tunnel towards Foundry Branch, which was the next working sh
a distance of about 2,500 feet, before we got down to solid rock th

Q. Was there any conversation between you and Captain Hoxie a
you had commmenced work at the west end, upon the point wheth
had been sufficiently tested before to justify beginning at all?

The WITNESS. You mean to leave the shaft and go into the tun

Mr. DAWES. Whether after you had commenced work at the
end there was any conversation between you and Captain Hoxie u
the point whether you ought not to have made further tests before
ginning tunneling at all?

The WITNESS. No sir; I have no recollection of such a conversat

Q. I want to ask you about this giving of the contract to Beckwi
Quackenbush instead of Dewees & Co. You say that your suspic
were excited that Dewees & Co. were not substantial and respons
bidders?—A. Yes, sir.

Q. And you say that one thing that caused your suspicions to be
cited was that Dewees obtained his blanks from some other source t
the office?—A. Yes, sir.

Q. Was there any other suspicious circumstance that contribute
the conclusion that the contract should not be given to Dewess & Co
A. There was the way in which the several copies of the bid
peared; the signature of the firm was signed differently on diffe
copies; the bond was not executed as required; was not filled in s
to make it a bond that appeared to bind the bidders to anything;
is part of my recollection.

Q. The bond is generally filed after the bid is accepted?—A. No,
I am referring now to the bidder's bond; that goes with the bid.

Q. What was the defect in the bidder's bond of Dewees & Co
A. My recollection is that while the bond pretended to bind the bid
to perform a certain function, that is, to enter into a contract in
event that it was awarded to them, the bond was fatally defectiv
the absence of the bidder's name from the bond. That is my reco
tion.

Q. That the bond was not executed at all?—A. The bond was
cuted and signed but the bidders' names did not appear as the par

ho were bounden by that bond to enter into the contract in the event
at it was awarded to them.

Q. Was there any other circumstance?—A. My recollection is that
e places of residence of some of the firm named were given as Wash-
gton, when, on examination, we found that they did not live at the
laces indicated. Then there was a statement made to me that he had
o plant of his own, but had arranged to get somebody else's plant to
o the work.

Q. A statement made to you by whom?—A. By Mr. Dewees; that
e had no plant of his own but had arranged to get some other con-
ractor's plant. There were a number of those matters that excited my
spicions.

Q. Anything else?—A. That is all I recollect at present.

Q. Did you communicate to him that there was a defect in the form
f his bid?—A. I presume I did.

Q. Do you recollect now?—A. No, sir; I do not recollect specifically.

Q. Did you communicate to him that you could not find in the direc-
ory the names of the men who had signed his bond as Washington
eople?—A. I am not confident that I did or that I did not.

Q. Did you communicate to either General Wright or the Secretary
f War the grounds upon which you recommended that the bids should
e discarded?—A. Specifically, yes, sir.

Q. In writing?—A. Yes, sir.

Q. And those are the reasons that are now stated by you?—A. I am
tating now from recollection as nearly as possible what I included in
at letter.

Q. You understand these reasons you have now given are the reasons
mbodied in that report?—A. Yes, sir.

Q. Was there any other reason embodied in your recommendation
at now occurs to you?—A. No, sir; I do not recall any other reason
t present; I can only say in relation to that matter that I incorporated
my letter to the Chief of Engineers accompanying the bids all the
bstantial reasons that occurred to me as bearing upon the questions
t issue.

Q. You can not repeat them now?—A. No, sir.

Q. This was a transaction of some importance?—A. Undoubtedly.

Q. What was the difference in amount between the lowest bid and
e next highest?—A. Somewhere about $82,000.

Q. It is always a subject of criticism, is it not, when a higher bid is
ccepted instead of a lower?—A. I appreciate that.

Q. Did you leave on record any evidence of the pains you had taken
see whether the one bidder was irresponsible and the other was re-
ponsible?—A. I have no record except the papers that were gone over.

Q. Did the transaction impress itself upon you so much at the time
at you can remember it now?—A. It impressed itself on me very
oroughly at the time.

Q. But, unfortunately, it has escaped you largely now?—A. Unfor-
nately I had so many different affairs to attend to after I came here
at I can not pretend to try to identify everything that occurred.

Q. And you had no expectation of being called upon to reproduce
our recollection of it in this way?—A. I had no recollection of being
lled upon. I thought the discharge of my duties there called upon
e to make a recommendation in regard to that matter, and I was com-
elled by my sense of duty to make the recommendations I did in trans-
itting the bids; such recommendations were made in writing, and the
ly reasons I had at that time for making those recommendations I
ave stated.

Q. What evidence did you leave in the record that justified you duct?—A. My conduct was simply to make a recommendation Chief of Engineers. I did not award the contract.

Q. The justification for your recommendation that the lowest should be discarded you did not leave on the record?—A. Yes, left the justification in the statement of my reasons for makin recommendation.

Q. But are those reasons for making those recommendations ord?—A. They are in that letter. I could not reproduce the cor tion except by making a record of it myself. I repeated what ha presented to me.

Q. Is it customary to give a party bidding an opportunity t his standing rather that to accept conclusions without knowledg it customary to let them have an opportunity to show whethe are able to carry on the contract or not if it is given to them?— the extent of presenting such evidence as will give one an oppor to judge.

Q. Do you assume that a man is not able, without a hearing fr on that point?—A. I do not.

Q. What sort of hearing did you give to Dewees & Co.?—A. Mr. Dewees a hearing, the result of which is stated in this letter Chief of Engineers.

Q. Do you recollect that hearing now?—A. I recollected it fore.

Q. What evidence did they present of their ability to perfor contract?—A. They presented no other evidence than Mr. De own statement.

By Mr. FAULKNER:

Q. Did you ask him for any other?—A. I have no doubt that I him for all evidence that he could give, and asked him to give the of any one to whom I could refer. My recollection is that the only ence he made in giving me outside sources of information——

Q. Did he refer you to a Mr. Emery, in this city, president of a in reference to his ability to furnish a plant?—A. I am sure that not, because I am satisfied if he had I should have seen Mr. Eme

By Mr. DAWES:

Q. He furnished you nothing but his statement, and you to against that, the statement of others, of whom he had no know Did he have knowledge of the statements of others in conflict w own statements?—A. He certainly had not, as nearly as I can rec any that came to my knowledge after my interview with him recollection is that we only had one interview.

Q. I am informed that you have testified on one occasion to a tel you received from Chicago.—A. I have found on going back to t ord that it was not from Chicago, but it was a telegram from Mr. with.

Q. Have you that telegram here?—A. I have forwarded it committee.

Q. Then the influence which you thought at that time the tel had upon you was simply the statement of a rival bidder commun to you by telegraph?—A. In answer to a telegram from me to hi based on a statement——

Q. Wait one moment. You accepted the statement of a rival b in answer to your inquiry to him, whether a lower bidder was opinion responsible or not, as an element in your conclusion?—A

ir; I did not; I did not ask his opinion as to the responsibility of a bidder, or anything like it.

Q. Then it was a voluntary statement of a rival bidder at a higher rate to whom you afterwards gave the contract?—A. No, sir.

Q. Then the telegram did not enter into your conclusion at all?—A. The telegram did enter into my conclusions.

Q. Let us analyze it a little. Your conclusion that this lowest bidder was not responsible was arrived at in part by a voluntary statement in a telegram from a rival bidder?—A. No, sir; there was no voluntary statement, but it was in answer to a telegram sent by myself to him, based on a statement made by Mr. Dewees, to wit, that he had arranged with Mr. Beckwith for the use of their plant; that he was going to get a plant from Beckwith; and that statement, with, I think, the further fact that he expected to get a plant from another person bidding on the same work, was an element that added to my suspicions, and I telegraphed to Mr. Beckwith to know whether in fact he had made any arrangement by which this firm could use their plant.

Q. What was your understanding at the time when you testified in regard to this telegram on a previous occasion?—A. My recollection was that it was in regard to a firm in Chicago that had offered to give him the plant.

Q. That he had referred you to a Chicago firm?—A. Yes, sir.

Q. And on telegraphing to that firm they replied that they did not know anything about it?—A. No; I did not telegraph to a Chicago firm at all.

Q. That was your idea when you testified before?—A. It was my recollection, at the time I testified to having sent the telegram, that such was the case, but since that time I have seen the papers and found that I was mistaken.

Q. Your recollection at the time you testified before was that an element in this matter was the reply, to the telegram of yourself, from a firm in Chicago that they knew no such man?—A. I will not say what I said on that occasion, but what I intended to say was that I thought it was from some Chicago firm. I was then speaking from recollection back to 1883, without having had any reference to the papers.

Q. You are satisfied now that you received no such telegram from Chicago?—A. Perfectly satisfied. I am satisfied that the telegraphic correspondence I had at that time was not with a Chicago firm, but with Mr. Beckwith, as will be seen by copies of two telegrams that I have furnished the committee since that time.

Q. If you have had any telegraphic correspondence on the subject with anybody in Chicago, you would have been able to produce it, would you not?—A. Oh, yes. I am perfectly satisfied, and was perfectly satisfied, as soon as I saw the dispatches, that they were the ones I had in mind at the time I testified.

Q. Not having found such telegraphic correspondence as you then referred to, you are satisfied that no such element as that entered into your conclusion?—A. Oh, yes, I am satisfied.

Q. And you are also satisfied that it must have been this telegram that you now refer to that you must have had in mind at that time?—A. I am perfectly satisfied that it was, because its purport and everything is as I recollect, and recollected at that time, except as to the place and the person from whom the telegram came. I had simply forgotten one of the parties in interest.

Q. Was there any other outside communication that contributed to

your conclusion?—A. None whatever; to the best of my recollec
that is the only one.

Q. Then all the information you got in reference to Dewees &
from outside sources of information was from Beckwith & Quac
bush?—A. No, sir; they gave me no information in relation to
Dewees. They simply answered a question from me about the st
ment that Dewees had made to me. Mr. Dewees had made a cer
statement to me, and I telegraphed to Mr. Beckwith to know what f
there was in the statement.

Q. I can not get at the particular thing which led you to the conclu
to recommend this serious step of rejecting the lowest bidder and tal
the next higher. Now, if you can put that fact into my mind in ans
to this interrogatory I would like to have it.—A. I can state it no r
concisely than that I made all investigation that seemed possible to
the result of which was to convince me that it was to the interest of
Government to recommend the rejection of the bid of Dewees & Co
the reason that all the inquiries I had been able to make and all
information I had been able to obtain at the time gave me the idea
they were irresponsible bidders, and not sufficiently qualified eithe
plant or finances to undertake such an important piece of work at
time.

Q. Your communication on the subject is in the record?—A.
sir; in which the reasons are stated in detail as laid before the Chi
Engineers and the Secretary of War.

By Mr. FAULKNER:

Q. Would you not have had a right, under this advertisement, t
quire these parties, before approving or disapproving the contrac
furnish a bond in accordance with what you regarded as the intere
the Government, as to their solvency, etc.?

The WITNESS. A bond in addition to the bidder's bond?

Mr. FAULKNER. No; the bidder's bond. Would you not have h
right to require these gentlemen, if you had doubts of their abilit
perform the provisions of the contract, before you either approve
disapproved, by reason of their supposed insolvency or inability to
form its provisions, to execute a bond to perform the covenants of
contract as provided in the specifications?

The WITNESS. I do not think that I would have had any righ
require any other bonds than those which the regulations give to
for our guidance in relation to contracts. One of those is the bidd
bond, by which the bidder is bounden to enter into a contract in
event that it is awarded to him; and the next is when that contra
awarded, the contractor's bond, which looks to the fulfilment of
contract. I think those are the two bonds and the only two bonds
I would have the right to consider or require

By the CHAIRMAN:

Q. It was the first one that was defective?—A. The bidder's b
was defective.

Mr. FAULKNER. But not on the question of solvency?

The CHAIRMAN. No, it was on the question of form.

By Mr. FAULKNER:

Q. What I want to get at is this: The kind of bond you have a r
to require when the contract is let; you have a right to require a b
at that time?—A. Yes, sir.

Q. A bond that the terms of that contract will be faithfully carried ut by the contractor?—A. Yes, sir.

Q. Now, if you had doubt as to the ability of those parties, who were ntitled by the terms of their bid to have your recommendation, would ou not have had a right to say to them, "Before I can approve this I ust be satisfied of the solvency of the bond that you can give, and you ust file your bond and execute it before I approve of the bid?"—A. I o not think I would have had the right to have said that; I don't think should do so; I have never known the question to come up though in hat way.

Q. Then how could you tell whether the party was able to perform he terms of the contract and give a bond to perform it that would be atisfactory to you, if you had doubts, without having a bond exeuted?—A. I could not be satisfied that he would give such a bond. hat is the question that always is determined when the contract is warded. I should think it would put bidders to a great deal of trouble, ut the question is a new one as to their being compelled to furnish in onnection with their bid a contractor's bond.

Q. If the doubt as to their ability to execute a bond for the faithful erformance of the contract was the only question, it would not put hem to any more trouble before executing the contract than after, ould it?—A. I am not aware that a contractor's bond has ever been alled for in advance of the execution of the contract.

By Mr. DAWES:

Q. It is simultaneous with the acceptance of the bid, is it not?—A. o, sir. The acceptance of the bid is made at the War Department; he practice is to abstract all the bids, and send a copy of each of the ids, with the bidder's bond, to the Chief of Engineers, with recomnendations; action is then taken by the Chief of Engineers in his recommendation to the Secretary of War, and the final approval or award omes from the Secretary.

Q. He accepts the bid, all the time conditioned upon a proper bond, loes he not?—A. He approves the award of the contract to such and uch a firm; the firm will be notified.

Q. Is that before the bond is required?—A. Yes, sir.

Q. Then the acceptance did not depend upon the bond, if it was done efore the bond was required?

The WITNESS. The contractor's bond?

Mr. DAWES: I am talking about the contractor's bond.

By Mr. FAULKNER:

Q. As I understand the bidder's bond, it is a bond that the bidder vill comply with the terms of the advertisement and enter into the conract if it is awarded to him?—A. Yes, sir.

Q. He is to give a bond that will be satisfactory to the Engineer Department?—A. Yes, sir; but it was the belief that this bond of Dewees & Co. was fatally defective, and that was one of the elements contributing to the belief of his irresponsibility. It was not one thing alone, ut a combination.

Q. But the mere matter of form could not affect the question of the esponsibility of the parties, because you could have required a new ond if it had been the form only that was defective.—A. My recollecion is that it was not simply the form, but the bidders were really ound to do nothing, because their name was omitted.

Q. Still, that was a matter of form; you could have required them to give additional bonds, could you not?—A. I did not so understand; I

do not understand that in this competitive bidding the executive
who has charge of receiving the bids and forwarding them, h
right whatever to interfere in any way or shape, either to a littl
a great extent, in the way of modifying or changing in any resp
bids that are submitted. They are submitted as sealed papers.
the policy of the Department is decidedly against allowing a
contractor to undertake to amend his bid or his forms or papers
way or shape.

Q. I understand that to amend a bid, of course, might be un
other bidders, but would it be unfair simply to call his attentio
formal defect in the bond and require him to introduce another
you even pass upon the bid?—A. So far as I know it has been
variable practice to forward the papers to the Department exac
received.

Q. And to reject a much lower bid simply because of a formal
in the bond?—A. To bring those facts to the attention of the D
ment and let the decision come from there, where the questions
at issue, etc., can be much better determined than by the Engi
his office. At the Department they can take advice as to all suc
points. I looked upon it simply as my function to forward the
leaving the ultimate decision with the Secretary of War.

By the CHAIRMAN:

Q. Did you have any legal evidence of the ability of Beckw
Quackenbush to perform this work?—A. No, sir; I think not.

Q. I mean as regards their experience in work of like cha
plant, etc.—A. No; I think that all I knew about them was the
sentations that were made at the time, that they were actually e
in large tunneling operations at West Point on the West Shore

Q. Was any written evidence submitted to you in respect to
bidders concerning their mechanical ability, their experience,
perform the contract if awarded to them?—A. I have no recol
of any other except as to one firm whose name I have now for
I had been spoken to about them and told that they had done
good rock work on the Detroit River on the lime kilns.

Q. Was any of this information in writing?—A. No, sir; I
not.

Q. Then what did you mean in your memorandum attached
report to the Chief of Engineers, under date of 13th of Octob
ommending that Dewees & Co.'s bid be rejected, and that Be
& Quackenbush be accepted, and referring to a memorandu
further detail regarding your reasons for rejecting Dewees & Co.
part of that memorandum reads in this way:

> No written evidence is submitted as required by the advertisement indicati
> ability to perform the work, either as referring to their experience on work
> character, plant at their disposal, or financial standing.

A. I think the advertisement required that they must establish
facie evidence of their capacity to do the work, or something t
effect.

Q. But you say that Beckwith & Quackenbush, to whom you
mended the contract to be awarded, did not furnish any writte
dence of the character mentioned in the paragraph I have rea
yet you give this as one of the reasons for rejecting Dewees & C
they did not furnish written evidence?—A. It is altogether p
that in the application that Beckwith & Quackenbush made for

to bid on they may have brought a letter to the office stating who they were; they may have furnished that written evidence.

Q. Yes, they may have done so; but you have just said that you did not recollect or believe that they did?—A. I do not recollect whether they did or not. I know generally that the instructions in relation to the issuing of those blanks for proposals required the office force not to send any out unless the parties brought a letter identifying the people and giving prima facie evidence that they were able to engage in the business.

Q. That was an order?—A. Those were the instructions that I gave generally in relation to that matter.

Q. Would anything of that kind be found in writing at your office?—A. No, sir; it was merely one of the orders of daily administration.

Q. You say in your memorandum and in your oral testimony that these were given through third parties. Can you remember anything more about this, now that it has been called to your attention?—A. No, I do not. But I should like to look over those earlier papers and see if there is anything bearing on these points.

Q. We have asked you and the War Department now for weeks to give us everything in the way of papers that you have, from top to bottom.—A. I think the probabilities are that they commenced the examination required in relation to that, at the date of the reception of the bids, instead of going back previous to that date and seeing what happened in advance of any papers being sent out.

Q. But at the time you wrote this memorandum and made this report, on the 13th of October, 1883, I suppose you stated the matter as you then understood it or knew it to be?—A. Yes, sir.

Q. After making some statement in your formal report about computations, etc., you say:

In this manner the lowest bidder is found to be J. H. Dewees & Co., but for the reason that their "bidder's bond" is fatally defective, that they have failed to comply in important particulars with the requirements of the advertisement and of instructions to bidders, as set forth more fully in the memoranda submitted herewith, I recommend the rejection of their bid.

The next lowest bidder is Beckwith & Quackenbush, of Mohawk, N. Y. From the evidence submitted, these parties appear to be fully qualified to do the work, and they have on hand a considerable plant available for the immediate commencement of operations. Prior to the preparation of their bid they made careful and intelligent examinations of the proposed work, drawings, etc. I recommend that the contract be awarded to this firm.

That is on page 43 of the appendix to our testimony. The memorandum referred to is on the next page, and that reads in this way:

The bidder's bond is fatally defective, the bidders not being bounden to do anything; the justification of sureties is not sworn to.

That appears from the papers themselves to have been exactly so.

The combination is not an established firm, but seems to have been organized to bid on these works; the place of residence of bidders is not given, as required by paragraph 7 of instructions to bidders; there appears to have been some uncertainty as to the name of the firm, which in one case is signed J. H. Dewees & Co., in another J. G. Dewees & Co., while in a third it is written both ways, and in this one it would appear that the name Dale was originally written instead of Dewees.

No written evidence is submitted, as required by the advertisement, indicating their ability to perform the work, either as referring to their experience on work of like character, plant at their disposal, or financial standing. In an interview with Mr. Dewees, with a view to obtaining information on these points, he stated that they did not own any plant, but had arranged to procure second-hand machinery. I subsequently telegraphed to one of the parties with whom it was represented that this arrangement had been made, but the fact was denied in the following telegram: "No, sir; have made no arrangements with them of any kind."

Mr. Dewees could not state what machinery he proposed to use, what or ho would be needed, nor give an approximate estimate of the steam-power re considers Randall's (?) diamond drill as probably the best for the work, tho gersoll's is also a good one; thinks that one drill will be sufficient for each h but can not say how much progress would be made in this manner. In the of any precise information on these important points, it is difficult to understa any intelligent estimate of cost could have been made, yet Mr. Dewees states made his bid on the tunnel without advice on these points, and that it wa cated almost entirely on prices bid or paid for other kinds of tunnels in othe ities. Further, the bid was made without examination of the drawings or o formation relating to the work on file in this office. Finally, the blanks for pr were not obtained directly from this office by any member of the firm, but in through an outside party in such a manner as to suggest the idea that the doubted their ability to "show *prima facie* evidence that they were able, fina and by experience, to undertake the work" as required by the published ad ment.

The further I have examined into this matter the more I am convinced t interests of the Government demand the rejection of this bid.

Your memory being now refreshed, I should like to ask you i can recollect anything more as to who it was that Dewees said t had arranged with for a plant; you have said already, I believe, t referred you to Beckwith?—A. Yes, sir; to the best of my recoll it was to only one person that he referred, that is, I do not reca body else, though that expression, "I subsequently telegraph one of the parties," would suggest that there must have been other one.

Q. That person was Beckwith, was it?—A. Yes, sir. Whethe expression refers to the fact that he mentioned Beckwith and Qua bush together, I do not know.

Q. You are sure that you did say something in regard to Beckwi A. I got from him the address of the parties to whom he referre sent the telegram immediately after he left the office.

Q. You knew it was the same party that was a competing bidd A. I think I must have known it; I do not recollect distinctly the matter now.

Q. Do you not think it rather strange that, before this contrac awarded and when the parties were struggling to see who shou it, he should have told you that he had made an arrangemen Beckwith himself, or with Beckwith & Quackenbush, to get their —A. I don't know that I would have said that to him directly; I have made up my own judgment as to it.

Q. But you are confident that it was Beckwith or Beckwith & enbush that he said he had made an arrangement with?—A. no doubt whatever, because the telegram was sent me.

Q. Here is the copy of your telegram to him:

WASHINGTON, *October* 10,

To CLINTON BECKWITH,
Herkimer, N. Y.:

Have you arranged to supply J. H. Dewees & Co. with any plant for const water works tunnel in this city in case contract is awarded to them? If so state how much.

G. J. LYDECKE
Major Engi

And this is the reply:

HERKIMER, N. Y., *October* 10,

To G. J. LYDECKER,
Major Engineers, etc., Washington, D. C.:

No, sir; have made no arrangements with them of any kind.

CLINTON BECK

Q. Those are the telegrams you refer to, I suppose?—A. Yes,

Q. We will now go to another part of this business. We wish to have you tell us if you knew or heard of the fact, during any part of the progress of the work on the tunnel, that any of the Government inspectors or subinspectors were doing any service, either in the way of overtime or keeping time, or any other kind of service, for either the contractors or subcontractors?—A. No, sir; I had absolutely no knowledge of that, or thought or suspicion of it, until I heard it developed in the testimony taken before the military court of inquiry. That was the first suggestion.

Q. Not even in one instance?—A. No, sir; not even in one instance.

By Mr. CLEMENTS:

Q. I was not able to understand fully from your testimony whether you mean to state that Dewees's bid was rejected mainly on the ground of informality and defect in the execution of the bonds, or whether it was on the other ground, that he was not a responsible bidder.—A. The principal objection was on the belief that I entertained that he was not a responsible bidder.

Q. The matter in relation to the execution of the bond could have been amended and corrected, could it not? He could have executed another bond and cured those defects?—A. I suppose he could, but it would have had to be under instructions from the Department to that effect, I presume; that is, I would only take the action in any case in forwarding the papers and inviting attention to all the facts connected with it, and, among others, to the fact that the bond accompanying this bid was a defective one.

Q. I see in some of Mr. Dewees's letters to the Secretary of War, copies of which we have here, that he insists upon being allowed to furnish information as to his responsibility and to furnish satisfactory evidence of that fact, and to make such bond as may be required.—A. All of that is matter of which I know nothing at all. To the best of my recollection none of those communications ever came before me directly or indirectly; I have no recollection of them at all.

Q. Would not that ordinarily, in the course of business affairs in the Engineer's Office in the War Department, in relation to a matter of the magnitude of this, be referred for consultation and advice to the engineer officer in charge, as you were in charge of this?—A. Well, I do not know; that would be a matter of discretion with the Secretary. If the papers were so referred they would bear the evidence on their face of the reference and reports. But I have absolutely no recollection about it. I do not think they ever passed through the office. Of course they could not pass through the office without there being a record, and there is no such record, and I certainly have no recollection of ever having seen them.

Q. You have recollection of the fact that Mr. Dewees obtained a copy of the specifications and instructions to bidders indirectly through some third party?—A. Yes, sir.

Q. As one of the suspicious circumstances that led you to advise the rejection of his bid?—A. Yes; that was one of the elements involved.

Q. Have you any recollection of his having called upon you in person for copies of those papers before he submitted his bid, and a refusal on your part to furnish them?—A. No, sir; I have no such recollection.

Q. Or that you told him to call at a subsequent time and get them?—A. No, sir.

Q. Do you know who it was that obtained them for him?—A. No; I

do not recall that now. I do not know that there is anything i
office in the way of record as to who received these plans.

Q. Do you recollect having any conversations or communica
with L. E. Johnson, a lawyer of this city, in behalf of Dewees?—
do not.

Q. You do not remember of his having called for the papers, t
cure them?—A. No, sir. I can recall in a very general way the
rence. The most of this detail was done in the office in the w
issuing those blanks, etc., by some one other than myself, but
general instructions that had been given.

Q. Do you remember of having any conversation with L. E. Jo
in relation to the matter, while it was pending, of any sort, in
of Dewees?—A. No, sir; I can not recall anything of the sort.
only thing I recollect at all specifically about it is the interview
Dewees himself.

Q. Are you quite sure that Dewees told you that he had arrang
get a plant from Beckwith & Quackenbush?—A. I am just as po
as I can be of anything in the world, because I made a memorand
this conversation at the time, jotting it down.

Q. Are you certain that that impression was not made on your
by conversation between Dewees & Beckwith, in which Beckwit
something about having some railroad iron and other material
could be used?—A. Oh, no, sir; this was a direct statement b
Dewees himself when I asked him where he was to get this pla
wanted to know where his plant was with a view of examining the
I remember that too well, the fact that he told me where he was
to get his plant, and of his stating that he had none of his own.

Q. I see in your memorandum, attached to your letter to the Ch
Engineers recommending the rejection of Dewees's bid, attached
copy of these proposals, you referred to the conversation had wit
wees in which he spoke of different kinds of drills which, in his
ment, it would be proper to use.—A. Yes.

Q. And upon those matters you seem to have relied in some me
in advising the rejection of this bid?—A. Yes, sir; I spoke of his
tioning the two different classes of drills that I recollect, the Ran
the Ingersoll drill.

Q. Did you regard either of those as an improper kind of drill
Oh, no; but I derived the idea that he could not tell the worki
pacity of either one of those drills.

Q. Are those good drills for working?—A. Yes; either of them

Q. Would you not consider it altogether probable that a contr
who himself was not a professional engineer, if he was financial
sponsible and able to execute the work, might make a contract o
sort with perfect safety to the Government and the public interest
yet be ignorant of those matters himself?—A. Well, I would if a
appeared and stated in the beginning that he knew nothing abou
work himself, but was simply the financial head of the firm, or wa
acquainted and equipped for the work by having his own expert
instruments.

Q. Did he tell you, in relation to those matters when you aske
about the examination of work and the kinds of drills to be used
chinery, etc., that that would be a matter for the judgment of h
gineers if he made the contract?—A. No; I think not.

Q. Did you obtain any other information touching the irrespons
of Dewees & Co., financially, than what you have already stated
No, sir; I think not. As well as I can recollect, the whole presen

f this was as stated in that memorandum. That gave the reasons in ll, so far as I can recollect, that were intended to meet the question f irresponsibility or danger of allowing the work, so far as the Gov- rnment was concerned, to go to that firm. I recall nothing beyond iat.

Q. So far as that memorandum shows it does not appear, I believe, iat you made any inquiry as to the financial standing of and ability f Mr. Dewees or any of his securities, does it?—A. I do not think there s any reference to it in there.

Q. Then you did not make any inquiry as to that point?—A. I have o recollection of anything material occurring specifically on that point. f that is not mentioned in the memorandum I might have understood iat to be a not very material point in connection with the others.

Q. Might it not have been they, not being experts themselves, were till altogether competent to employ people to do the work for the con- actors?—A. I have no doubt that it might have been, but to the est of my judgment that was not the case from such information and vidence as I could obtain at the time.

Q. But you did not make any inquiry as to their financial ability to mploy others?—A. I beg your pardon, if you understood me that way. say that my recollection does not enable me to say whether I did or id not. What I wanted to say is that I thought I had presented in that tatement the material points that led me to the conclusion that is con- eyed to the Department.

Q. And in that you did not state that you had ascertained, by inquiry r otherwise, the fact that they were financially irresponsible?—A. I do ot recollect that I did so state; if it is not there, I did not state it.

Q. Might not the Department have rejected, under the advertise- ient, all the bids and advertised again?—A. Yes, sir; I think a pro- ision is almost invariably included in the instructions to bidders, eversing the right to the Department to reject any and all bids, and I resume it was reserved in that advertisement as well.

Q. I believe you have already stated that the difference between the id of Dewees & Co. and that of Beckwith & Quackenbush was about 80,000?—A. About $82,000, as I recollect it. It was a question of the roportions for the different kinds of lining which were figured out, and he fact was indicated to us upon examination that we could put a little iore lining with Beckwith's bid than with the other.

Q. Do you not think now, if there was a defect in the bid or bond of Dewees & Co. which could not have been remedied by the execution of nother bond, that it would have been good business administration to ave rejected or advised the rejection of all the bids, and advertised it gain, where the difference was so great as $82,000 on the contract?—A. think, considering the outcome, it would have been very good if we ad re-advertised the work or done almost anything else. But, looking o the case as altogether one of foresight, I can not look back at it now nd think that I could have made any other recommendation, under the ircumstances, than I did then and there.

Q. But if you had not satisfied yourself fully that Dewees & Co. ere not responsible financially, so that they could make a bond that ould secure the Government, and employ people who were competent o do this work, do you not think it was in the interest of economy and ood administration to have ascertained that fact, or if they were re- ponsible and their bond was defective and could not be remedied, to ave rejected the bids and given them another chance, in the interest f the Government and of economy as well as fair play to the bidders?—

A. I believe as a fact all those considerations did come in, to our faction that their financial standing was practically not sufficien that as a firm they were not qualified to do the work.

Q. On an important point like that of their financial standin responsibility—which, if you were satisfied, was wanting in this how can you account for the fact that you did not refer to tha important matter in your memorandum or letter advising the rej of the bid, whereas you refer to questions which must appear t been of much less importance than that?—A. I can not account in any way at this time. I simply furnished, as required, the ment of such facts as I could get hold of, for the information Department in its decision as to the award of this contract.

Q. I do not see in this appendix that we have here any memora in relation to the bid of Dewees & Co. Did you make one?—A. is the memorandum I was referring to.

Q. In your letter of October 13 to General Wright, Chief of neers, you recommend the acceptance of the bid of Beckwith & Q enbush and the rejection of the bid of Dewees & Co.?—A. Yes,

Q. You state—

> The next lowest bidder is Beckwith & Quackenbush, of Mohawk, N. Y. Fr evidence submitted these parties appear to be fully qualified to do the work, a have on hand a considerable plant available for the immediate commencer operations. Prior to the preparation of their bid they made careful and inte examinations of the proposed work, drawings, etc. I recommend that the c be awarded to this firm.

A. Yes, sir.

Q. You also recommend the rejection of Dewees & Co.'s bid for re not only stated there, but referred to more fully in the memorandu companying. Now, was there an accompanying memorandum, in tion to what you say in the body of the letter, relative to the Bec & Quackenbush bid?—A. No, sir.

Q. I believe you have stated that you did not have any inform in relation to Beckwith & Quackenbush?—A. To the best of my lection I stated, in answer to the question that was asked this mo as to whether there were any papers on file in advance of the op of the bid, that I supposed that the examination had been comm at the date when the bids were opened, instead of going back o point of time to see whether there were any papers on file bearing the contract. I will cause an examination to be made to see if were any papers prior to that time.

Q. You say that you had not before known that they were bidd A. I had not.

Q. Can you call to mind any inquiry that you instituted in re to their financial standing, or any information in regard to them than what you obtained by your conversation with them?—A. can not recall any special inquiries. I can only state that the g impression that I now have is that we received information tha were contractors in good standing, having done a large amount nel work, and were doing a large amount at that time; that a amount of their plant was about being available by transfer to a point on account of the completion of certain work on which the been engaged. I was satisfied that they were men actually doi tunnel operations then as an organized firm.

Q. If Dewees & Co. were financially able to procure a plant, an important matter that they should have it here on hand immed at that time, or could they not have procured it within a reas

me?—A. If they had had ample means they could have procured a ew plant as well as used an old plant.

Q. So that it was not a necessity for men of financial ability to per- orm the contract to have on hand a plant at the time of the debt?—A. lo, but I should regard it as an absolute essential that they should have lenty of money if they were a well organized firm and had sufficient nowledge of their work to carry it on.

Q. Did you inquire of Dewees as to his having had various contracts or overground work, tunnel work, railroad work, or underground work ithin the last twenty years at different points?—A. I have no recol- ection of making any special inquiry in relation to what work he had een doing.

Q. Do you recollect what he told you in relation to that?—A. I sim- ly recollect that all he told me tended to convince me of the fact that e was a totally irresponsible party to do this piece of work. Now that s the only way in which I can recall that.

Q. You can not specify what it was that he told you that made you hink so?—A. No, sir; I can not recall the specific conversation.

Q. You say you do not recollect anything in relation to L. E. Johnson, s attorney for Dewees & Co., coming and making inquries in regard to he matter at any time?—A. No, sir.

Q. Or any attorney?—A. I have no recollection of any attorney ex- ept in that general way; that it is the impression I still have with me hat there was an attorney, or some one here in town, who got the pa- ers from the office for Mr. Dewees. I have not the least idea now who hat person was. Possibly I may have seen him, and possibly not. his occurred during a period of conversations daily with anywhere from half a dozen to a dozen attorneys representing interests of clients, par- icularly down at the District Office, and it would be impossible for me, nd is impossible for me, to recall anything special in that way, and I ertainly do not recall any conversation with any attorney connected ith Dewees & Co.

Q. You say you gave instructions to your subordinates not to furnish hese specifications and papers except to persons who could furnish rima facie evidence of being bona fide bidders?—A. Yes, sir; sub- tantially in the wording of the advertisement as to one of the quali- cations for getting the papers.

Q. What was your objection to furnishing copies of the bids to any- ody that called for them and wanted them?—A. The objection is that t has been the experience that frequently firms are organized as straw idders, and a great deal of trouble has occurred in the way of bad work rom incompetent people; and this being a work of such magnitude, nd requiring such particularly experienced people to do it, it was done holly with a view of protecting the Government.

Q. You say you do not remember any attorney representing Beck- ith & Quackenbush calling at any time before the contract was warded?—A. No, sir; I do not.

Q. Do you know of any attorney who has represented them here re- ently in relation to this work?—A. Well, I know of one who I believe o have been their attorney, although he has appeared in the papers as onsulting engineer.

Q. Who is that?—A. Mr. A. C. Buell. I think he has generally signed imself as consulting engineer, but I have understood that he is attor- ey for them.

Q. Do you know anything of any services of General Bissell, of Buf- lo, N. Y., in relation to this work recently?—A. No, sir; not so far as

I know anything about it. This is the first time I have heard t
in connection with the work in any way or shape.

Q. You have not seen that matter mentioned in the papers
this last three months?—A. I do not recall the name of Bissel
nection with it at all; it did not impress itself on me if it has
in the papers.

Q. Do you know him?—A. No; I have not the least idea
is referred to.

Q. I refer to Colonel Bissell, of Buffalo, N. Y.?—A. I do n
him in any way or shape, by sight or by reputation.

Q. Have you had any communication or interview with an
representing Beckwith & Quackenbush this year in relation
work?—A. None whatever; unless Mr. Buell be regarded as t
yer. He saw me in regard to the extension of the limitation of
the completion of the contract to November 1. That is the on
lection I have of any lawyer speaking to me in relation to th
at all.

Q. To go back to the question of beginning the tunnel wor
lieve you have stated that the change of plan to tunnel the whol
of the conduit was first provisionally approved?—A. Yes, sir.

Q. And that provision was that the tunnel should be constr
the rock was found to be solid?—A. Provided the examinatio
made gave indications of finding generally solid rock along the
do not think it said provided the evidence showed that solid ro
be found all through, but that evidence generally of solid rock
be found. I think that was the nature of the provisional approv

Q. Up to the time that you relieved Captain Hoxie of his dut
nection with this work you say that only one shaft had been sun
rock?—A. Yes, sir; that was sunk as a trial shaft during the p
investigation prior to the final adoption of the tunnel project.

Q. What means did you take to ascertain that the conditi
isted that justified the beginning of the tunnel in accordance
provisional approval; that is, that solid rock generally was
where the tunnel was to be constructed?—A. The facts in rel
that were ascertained under the personal directions of Captain
to whom the execution of that examination was intrusted.

Q. How could that be when only one of the shafts of the tun
been sunk into the rock prior to the time that he was relieved fr
duty?—A. The indications from which the belief was deriv
solid rock would be generally found along the line were, in add
finding this rock at the extreme easterly point (where we exp
find it, from the general geological formation of the rock), deriv
the well digging and the out-croppings for sewer construction,
different points along the line, as specified in his reports to
derived from previous reports that I can recall only in a gene
I think one report was made in which he speaks of extend
acqueduct by tunneling, not at great depth either, but in which
that the tunnel will be driven generally through a gneiss rock,
the characteristic formation. I think there were also some
ports before me in which the existence of solid rock is referred

Q. But is it not true that all those things you refer to now as
you to those conclusions were those reports which had been mad
this provisional approval of the tunnel plan?—A. No, sir; tho
were not before me.

Q. Here is the point I want to get your attention to: It see
when this tunnel plan for the whole length was provisionally a

t was felt then to be certain by the War Department that solid rock lid exist there; the mere fact that it was provisionally approved shows hat. Now you say that up to the time you relieved Captain Hoxie here had been but one shaft partially sunk into the rock.—A. One shaft was sunk into the rock.

Q. And that was only partially done?—A. Sunk into the rock to the point that Captain Hoxie believed, and so did I, from the rock brought up, that it was down to solid rock, that we had penetrated to solid rock.

Q. Was that shaft then as deep as the tunnel is now?—A. No; it was sunk deeper afterwards.

Q. In view of the fact that this was not an absolute approval, and that approval was dependent upon facts to be ascertained by actual tests, and in view of the fact that you were the responsible officer in charge of so important a work as this, and in view of the further fact of the expenditure of so much money, did you think that that was a sufficiently practical test to determine the matter?—A. It was sufficient so far as the existence of one shaft was concerned; but there were other evidences that pointed to that conclusion in that direction, in the nature of wells along the line that were known to be in rock outcroppings.

Q. And all those matters were visible before the provisional approval were they not?—A. It is altogether possible that they were, but they were not known to me; for when I submitted my plan I was almost a stranger to the work here and had not seen, and only knew in a general way, what was told me in regard to the specific points that this rock was found and determined to be of the requisite character after submitting the original or provisional plan.

By the CHAIRMAN:

Q. Was it the nature of the rock you were hunting for, or were you trying to find out simply that there was a continuous line of strata of rock all the way underground?—A. That was the general purpose of the investigation; in other words, to determine whether the tunnel would be practically a question of rock excavation or whether there would be a good deal of quicksand and stuff of that character, so as to make the tunnel more expensive and more dangerous and require lining.

Q. You assumed then, or concluded from the indications you had seen, that if you found the rock was continuous within reasonable distances below the surface of the earth, the problem was one capable of satisfactory solution?—A. Yes, sir; I believed it to be the simplest method of construction.

Q. You did not take into consideration at that time the circumstance that has since developed, of the possibility of the rock, when you found it, being of a character that would make a lining an indispensable necessity?

The WITNESS. A continuous lining?

The CHAIRMAN. Yes; or a lining substantially continuous.

The WITNESS. No, sir; it was not believed at that time at all that anything like a substantially continuous lining would be required, but that there would be of necessity some isolated places, where faults were developed, that would require the introduction of lining.

Q. Why did you not make borings at several places along the proposed line down into the rock to the depth where you wished to go, in order to ascertain the character of the rock down to the depth of, say,

10, 20, 30, 40, or 50 feet below the surface of the rock that you under the ground; that would have been an inexpensive perfor comparatively, would it not?—A. It would have been a matter o considerable expense; not an incommensurate expense, I shoul it would not have been inexpensive by any means.

Q. Ten thousand dollars would have made ten borings, would it n A. Yes, sir.

Q. Why did you not do that?—A. Well, we believed that the i tions we had along the line were such that the borings would no us any material increase of information.

Q. That is, you believed that the borings would show solid ro the main?—A. Yes; in the main. Though borings at intervals the line would not give us such good information as a well, for ins that had been excavated of a diameter of 4 to 6 feet, or as a shaft v

Q. Why?—A. Because it only gives the evidence at intervals o 1,000 or 2,000 feet, and only the evidence obtained from a very hole at that.

Q. There are intervals between wells, I suppose?—A. Yes, sir; think I could judge better of the character of the rock obtained f hole that was anywhere from 6 to 10 feet in diameter and where siderable portion of the rock taken out of it could be seen.

Q. Tell us the wells you inspected.—A. I did not go to the bott any of the wells.

Q. How many wells were you informed were inspected?—A. I forgotten now. They are detailed and their location is plotted in tion to the line. They are detailed in the published reports that a pany my reports. Each spot is indicated and numbered; there quite a number of them.

By Mr. CLEMENTS:

Q. Did you yourself go into this first shaft that you say was into the rock before you relieved Major Hoxie?—A. I do not reme whether I did before he went away or not.

Q. I mean before the official approval of the plan was made.— think there is a little misunderstanding in regard to the relief of tain Hoxie. I did not relieve Captain Hoxie from all responsibil connection with this work, nor put Captain Symons in charge. pected that Captain Hoxie would continue as the consulting an vising engineer, in connection with myself, right along; so that was no order relieving him; there was simply an order assigning tain Symons to the immediate supervision of that work.

By the CHAIRMAN:

Q. Did Captain Hoxie have any conversation with you, after h in effect relieved, concerning the character of the rock in the that you were sinking?—A. I have no recollection that we ha special conversation; I think we must have had some conver about the rock and about going to the greater depth.

Q. Do you, or not, remember, when you had got the Rock Cre Foundry Branch or west connecting shaft just down to the dis where it was intended theoretically to go on the original plan, of ing a conversation with Captain Hoxie, in which he told you he had been—as a mere matter of curiosity—as it was none business at that time—down there, and that the character of the was inadequate to the purpose in view, and that you ought deeper?—A. That question was asked before this morning, but I c call no talk with him. I recall a conversation, but I can not say wh

with him or Captain Symons, as to the propriety of entering into tunnel from the west shaft, even though we were not down in such rock as we desired to have or expected. We went some distance below the point originally contemplated, and, still not finding very good rock, the question was whether we should start into tunnel, that being in good rock, at the shaft immediately east of it, Foundary Branch shaft; and the conclusion was finally arrived at that we would not go any deeper at that particular shaft, but would start lining that shaft, with the expectation that at a very short distance we would get into good rock that was developed up to that time from Foundry Branch. Whether that was a conversation with Captain Hoxie or with Captain Symons I can not say now. I think it more likely to have been with Symons.

Q. When you found that the rock down to the depth you intended to go was not satisfactory for the purpose of carrying water by itself, did you report to your superior officer, the Chief Engineer?—A. No, sir, I think not; I do not think there was any special report made on that subject.

Q. Was the first official report, or any other communication that you made to him upon the subject of the disappointing nature of the rock found as the tunnel progressed, made in your official communications that are in print, so far as you know?—A. Yes, sir; in the annual reports, commencing with the report of 1885, I think, the fact of encountering the rock that indicated much more lining to be necessary than was thought to be necessary in the beginning was made known, and from that time on the matter has been the subject of reference continuously.

Q. You say that Foundry Branch shaft sunk to the contemplated depth was found to be in satisfactory rock?—A. Yes; or it may have been a few feet below, but it was not to any considerable depth below.

Q. Wherever you went you found it to be satisfactory. Now that the tunnel has been drifted each way from Foundry Branch and exposed, is it now found that it is suitable for carrying water without lining?—A. No, sir; it is found that some of the rock has been disintegrating, and that the greater portion that has been submitted to lining in that section has developed the fact that while it did not appear that it was an imperative necessity, still, as a safeguard it would be better to arch the tunnel. Most of that has no lining at the bottom of the tunnel, but simply the side walls supporting the arch.

Q. How near the Foundry Branch does the lining begin, going west?—A. I can not tell you what the distance is from the portal.

Q. Of course I do not care for details, but I mean in general?—A. My recollection would be about 300 feet; I have been through there quite frequently, but I can not recollect the distance.

Q. How far east from the Foundry Branch shaft does the lining begin, according to your best recollection?—A. I think it is quite close to the portal on the eastern side.

Q. But the present cross-sections and profiles and drawings would show accurately, would they not?—A. Oh, yes; the points at which each piece of lining was completed are all down on them.

Q. The topographical engineering, as it might be called, shows the initial point at each shaft, does it not?—A. Yes, sir.

Q. So that, for illustration, at Foundry Branch, going west, your stations are in the ordinary way marked on your papers 1, 2, 3, and 4, representing distances of 100 feet each?—A. Yes.

Q. And then the decimal fractions represent distances between the hundreds?—A. Yes, sir.

Q. And they are numbered each way from the shaft?—A. Ye
each way, east and west.

Q. And so at all the shafts?—A. Yes, sir.

By Mr. CLEMENTS:

Q. After this tunnel plan was provisionally approved and you
the shafts into the rock, did you make a personal inspection by
into the shafts to determine whether, in your judgment, you had re
rock sufficient to comply with the requirements of that approval
I do not think that I went into all of them. Samples of rock
brought into the office.

Q. Did you go into any of them?—A. Oh, yes; I have a s
recollection of going into Rock Creek; but for the most part th
was examined at the office there.

TESTIMONY OF GENERAL M. C. MEIGS.

SATURDAY, *January* 5, 1

General M. C. MEIGS, sworn and examined.

By the CHAIRMAN:

Q. What is your age?—A. Seventy-two.

Q. You have been an officer in the Engineer Corps of the Arı
how many years?—A. Fifty-two years in the Engineer Corps a
the Quartermaster's Department.

Q. You were in the Engineer Corps until the war of the rebe
and then you were appointed Quartermaster-General, I believe
Yes.

Q. As one of the Engineer Corps you had in charge the constr
of the aqueduct from the Great Falls to Washington, I believe
Yes, sir; the Washington Aqueduct.

Q. What year was that completed?—A. The water was brou
in 1859, but the work was not quite finished. The water was br
in from the Little Falls reservoir. At the breaking out of the w
1861 I gave up charge of the aqueduct; and was appointed Qu
master-General.

Q. Will you state whether that is a flowing conduit all the wa
if not all the way, what part of it is under pressure? State in ge
I do not, of course, expect you to be perfectly accurate.—A. Mos
is under pressure. The aqueduct started with a circular conduit
with masonry. The upper line is 151 feet above tide, where it
from the Great Falls, while the lip of the dam was intended to
150 feet. So that in a conduit 9 feet deep at the beginning, as it
be when the water was flowing just over the dam, it would have
of depth of water in it. But it descends almost exactly at the r
9 inches to the mile (9 inches in 5,000 feet) until it reaches the rec
reservoir, and so continue to the distributing reservoir, the dis
being 12 miles; it falls several feet in that distance. So that
Cabin John Bridge the top of the arch comes to the level of the
the dam, and further down the aqueduct, when the river was up,
be under pressure. That dam has not yet been carried to tha
height.

Q. How thick are the walls of this aqueduct?—A. The normal thickness is 13 inches—three rings of brick.

Q. Laid in cement?—A. Laid in cement. In many places where the ground was safe and sound we omitted the inner ring, and then it was only 9 inches thick.

Q. What is the longest tunnel on that line?—A. I think it is 1,400 or 1,500 feet; I do not remember exactly.

Q. Where is that tunnel?—A. It is the first one after leaving the Great Falls. It passes under the rock, and runs from 200 to 300 feet into a side cutting, and then comes another tunnel which is about 400 feet.

Q. How large is the longest tunnel?—A. It will be 9 feet in diamter when lined with 13-inch brick-work.

Q. After this long time do you remember how that brick-work in that tunnel was backed, as regarded safety on the outside?—A. It was filled up with masonry.

Q. Actually built in masonry?—A. Yes; but very little of it was lined at all.

Q. The rock was solid?—A. It was as solid as this character of rock can be. I should say that the prevailing character of the geological formation is a gneiss rock; it is very much contorted, folded, cracked, seamed, and broken rock, generally in strata, up and down; and every now and then you will find a layer of what we call rotten rock, which, by the action of the atmosphere and moisture, has lost its cementing quality.

Q. The amount of pressure at the top in this aqueduct that you built must be very slight, then, I suppose.—A. At the top it is nothing.

Q. The greatest pressure is that merely resulting from 9 feet of water?—A. Nine feet of water; except as it descends toward the reservoir, where it falls, say 4 or 5 feet, and there the pressure would be 14 to 15 feet at the bottom, 4 or 5 at the top.

Q. Taking that place where there was the greatest pressure, down at the distributing reservoir, with a head of 14 or 15 feet, did you resort to any extra precautions as regards the danger of lining giving away?—A. No, sir.

Q. You had three rings of brick, well laid in good cement mortar?—A. The safety of an aqueduct built in earth is the weight of the earth over it, not the strength of the brick. Nine-tenths of that conduit, I suppose, is built of clay or gravel which themselves are water-tight. The banks of a stream are of clay and gravel, and the water does not leak through them.

Q. The tunnel has a packing on the exterior of the brick-work?—A. Yes; I was told, when I showed my profile and cross-sections, by some people of experience, that so thin a line of masonry would not stand. My reply was, that at every point the level of the top part of the arch which covered this whole thing was higher than the level of the pressure of the water, the head of the water, and if the earth weighs just about twice as much as the water, the balance of pressure would be inward and not outward. The result is that that has been in operation now for twenty-odd years, and there has never been a leak anywhere that I have heard of. It was built with very great economy. The Croton Aqueduct at New York, which was one of the first aqueducts built in this country, has two quite strong abutments, walls on each side, and then a semi-circular arch at the top, but the walls are thick enough to stand alone. While these walls would not stand under the

pressure of much head of water alone, they are always covere
backed with rubble dry-stone packing.

Q. Except where you resorted to tunneling to get through
of the hills, in the instances that you have already mentioned,
down below the surface of the earth was this aqueduct laid?—
stantially it is all below the surface of the earth. It was
built along the sides of hills, running along the bank of the
River, and our aim was to make the excavation as small as
sistent with safety. But it was always necessary to provid
water running from the high ground above, which lies 300 fe
the level of the aqueduct, so as to run the water across the li
aqueduct without cutting it. I endeavored to make it like a
the side of a hill.

Q. What was its general depth where it proceeded in earth
in tunnel?—A. As a rule the bottom of the aqueduct would
below the surface at the point where it crosses.

Q. But taking the aqueduct road, as far as the aqueduct
from the receiving reservoir, and what is the thickness of the e
the surface of the road to the surface of the brick arch?—A.
no less than 2 feet. When the head or level was 145 we kept
which would be 2 feet above the highest water. That is my rec
So that down toward the reservoir there are 4 or 5 or 6 feet of
top of the arch itself.

Q. In fact you knew that that part of it must receive the in
pressure of the water?—A. Exactly; that is the idea. I kne
time the necessity of more water in the city would occasion th
of the dam; that in fifty years we might want to raise the da
and in one hundred years perhaps 2 feet. This aqueduct wou
rise of a foot; by putting 2 feet more water in you could raise
foot with 2 feet more of earth on.

Q. What are the difficulties, if any, in continuing an aqued
the present distributing reservoir to this new one, on the sam
ples and practically in the same way that you built the othe
stopped the aqueduct where it entered the distributing reservoir
if it had been continued from that point into town the high
approached the river so closely that it would have encroached
town itself, and I would have had to come through Georgetown
a great blocking of the streets, or else come through by a tun
in the ground between the distributing reservoir and Georgeto
is a deep ravine crossing the line of the aqueduct near College
and there it would have been necessary to tunnel or go away o
edge of the river. We traced an aqueduct line or road or railro
the slope of the hill by the contours of the hills, and that wou
the section of the hills by a slowly declining plane. That wo
very crooked line. That would increase the length of the aque
haps two or three times. It is very difficult and contorted gro
the distributing reservoir into the city, with two very deep r
cross, Rock Creek and College Branch.

Q. College Branch is now ordinarily called Foundry Branch,
It is the first deep valley east of the present distributing res
it not?—A. I am not positive. I think one set of my enginee
it Foundry Branch, and the other set called it College Branch.

Q. Supposing from the eastern line of the present distributi
voir a tunnel were made across to Foundry Branch, what are
culties, if any, except in the increased length, in following subs
the contours and either crossing Foundry Branch by a bridg

please, or following the contours of the hills all the way around until you get over into the neighborhood of the new reservoir? That green line on this diagram is the flowing contour.—A. It is less crooked than I supposed it was. This is the one that struck me.

Q. That is the one between Foundry Branch and the present distributing reservoir?—A. That land is more favorable than I supposed it was.

Q. Aside from the question of increased distance by following the contours, what are the objections, if any, from an engineering point of view and from a practical point of view, to the delivery of water and the construction of the aqueduct by running substantially the same kind of a conduit that you built after reaching Foundry Branch, in the way I have suggested, by running the tunnel through that one hill, and bringing the water around here [indicating] on the same plan you tried?—A. It can be done, but in so crooked a line as this which I now see, I should prefer, I think, to have here and there a tunnel. Tunnels do not cost a great deal of money unless they are very deep and go through very difficult rock. Perhaps I ought to say that in 1876 I published in the newspapers here on the 1st of June a letter which I wrote on the last day of May. I have a printed copy of it, taken from the Republican, in which I suggested for public consideration, in view of what has happened since, that the next addition to the means of bringing water into the city should not be a pipe 36 inches in diameter, which cost $399,000 and some hundreds, but by an aqueduct tunnel upon the same grade, used above the reservoir, and which would be about 20,000 feet long and would cost very little more at the then prices than the 36-inch main would, and that would bring into the city 60,000,000 or 70,000,000 gallons of water per day instead of 10,000,000.

That letter I wrote because I found, on returning from Europe in the spring of 1876, that the Baltimore people were then considering the question of water supply of that city from the Gunpowder River. Some fifteen or twenty years before that they had consulted me, as they had a great many other engineers. They had a letter written and distributed to a great many engineers, asking their opinions in regard to the different projects that were under consideration. One idea was for bringing in water from Jones' Falls, a stream that flows through the city itself; another idea was to bring in the water of the Gunpowder River by pumping it over a ridge; still another idea was to bring in the water of the Gunpowder through an aqueduct tunnel, which last idea was suggested, I think, by somebody who was not an engineer. I looked over their plans, and in my reply I said to the council that it was my opinion that the best thing was the direct tunnel, which, I think, they estimated would cost about $800,000. My idea was that the Gunpowder was so much larger a stream than the Jones' Falls, that if they did not do that, after spending, perhaps, $1,200,000 on the Jones' Falls project, in twenty years or so they would finally have to adopt the Gunpowder plan. In 1876 I came back from Europe and found them at work on the Gunpowder. They had tried the Jones' Falls, and found that they wanted more water, and were then building the Gunpowder aqueduct tunnel. I wrote to the engineers and found that their estimate for making that tunnel was $25 a running foot. From that information I made up my mind that the tunnel to be made here would not cost much more than $25 a running foot.

Q. The tunnel you are speaking of is a grade tunnel, is it not?—A. It keeps the grade straight instead of crooked. I sent that letter to the different officers who from time to time took charge of the aqueduct, and asked them to have a survey made so that when the question of

increasing the water supply came up they would be prepared to report with estimates. But they were busy, or had other thin tend to, and though they seemed to be very thankful for my sug nothing was done about it. About 1879, I think, or earlier th a committee here of which Senator Rollins was chairman——

The CHAIRMAN. The Committee on the District of Columbia

The WITNESS. That committee took up the question of the wa ply of Washington and I saw a proposition to put in a long pipe, which would cost $400,000, and I wrote to Mr. Rollins ca attention to the subject, and I think I sent him a copy of this letter I have spoken of telling him that that idea was a mist saying that it was safe to say that a tunnel would cost very litt There is nothing so lasting in human engineering as a tunne not know of anything that lasts so long and is so free from or even possible damage. The only danger I can think of to is from an earthquake, which might crack or dislocate it. I wa before the committee, and the result was that in 1881 a bill wa for tunneling. The error, I think, in this tunnel is that of goi too deep, under the mistaken idea that they would find rock im to water. There was another project in regard to building a ervoir. The reservoir is entirely useless.

Q. What would be the comparative expense of building a gr nel where it goes through rock and where it goes through ear If you find such earth as you see excavated at the site of the libr earth would be a great deal cheaper.

Q. That is, you could carry a tunnel through that kind of earth without the difficulties and dangers that would result fr ning a tunnel through soft earth?—A. Yes. It is only when sand, quicksand, or earth saturated with water that there is a culty in making a tunnel through earth.

Q. A grade tunnel from the present distributing tunnel to t one, making a substantially straight grade, leaving a sag Creek, if you please, so as to furnish means of emptying it, wo go through the hills at the north at a very considerable depth it not?—A. Yes.

Q. I show you a profile which we have had constructed wit to seeing how that would look on the very idea you are now s of. This red refers to the tunnel line.—A. I got a telephone from Mr. Rollins one day when I was in the Quartermaster-G office, asking me if I would send him a draught of a bill and pl tunnel. I was at work upon it at the time. I replied, "In I will send you a draught of the bill and report, with plan and which I did, and which was returned to me after Congress adj and this tunnel was an exact repetition of that.

Q. I want to call your attention to this: That the depth of entirely earth at the deepest place is not more than 70 feet, a 30 to 70 feet at other places for quite a long distancee. Now earth at that distance below the surface happened to be of a cl of quicksand, or soft sand, or any kind of crumbling earth, the and difficulty of building a tunnel through it would be very gre hanced, would they not?—A. Yes; but quicksands are never ve at least they are not according to what I know of them; I can that I have had much experience. The only quicksand I ha found in my practice is just this side of the distributing reserv I have no doubt you would be interested to go there and see it I did not expect it and was not prepared for it. We had fou

at all all the way from Great Falls down to the distributing reservoir, but in putting down the iron pipes this side of the distributing reservoir I ran across a thin stratum of quicksand. I thought at the time it was a small matter and made no preparation for it, and we came through by brute force, though we had to lay one pipe at a time.

What we would lay in one day perhaps we would find the next morning lifted up by the floating sand. That stratum of quicksand only extended for a few feet, and at last we got through it. But the upper side of the sloping hill, which is perhaps 10 feet high, over an area of perhaps 200 feet, sunk down, and the sand under that ran out and came out in our ditch. That is the only experience I have ever had with quicksand. But there was the Boxhill tunnel in England, which went through very bad quicksand. It is not, however, very likely that you would find any very great quantity of quicksand any place. It is a geological drift of the glacial period which covers our rock here, and we can always get below it a greater depth.

Q. But, as you have explained about this recently-constructed tunnel, the greater the depth the greater the difficulty in various ways.—A. Yes; I would not go down deep, unless I was obliged to.

Q. What would be the comparative advantages and disadvantages between cutting a grade tunnel, such as is shown by that diagram, and which is in substance just like the one you suggested nearly ten years ago, and building a flowing conduit substantially like the one you have already built from the Great Falls, following in the main the contours of the groun l, so as to keep the conduit very near to the surface, where, in case of any accident, it would be much more easily accessible and more readily repaired, and so on? Give us your views as regards the comparative advantages and disadvantages of a contour conduit, as I will call it for distinction, and this grade tunnel through the earth.—A. The contour tunnel for the delivery of water is just as good as the other. It is more liable to accident, because it would be more liable to injury from what we call water-spouts or cloud-bursts, whereas a tunnel 50 or 60 feet under ground seems to be absolutely safe for ten thousand years.

Q. Have there been in the last twenty years any cloud-bursts which have done any damage to your conduit from the Great Falls?—A. "Cloud-burst" is rather an indefinite term, and comes to us from Nevada, but we have showers here in which 4 inches of water have fallen in two hours. That is equal to 2 inches an hour.

Q. What did those showers do to your aqueduct which you built?—A. I looked out for that. They had not done it any harm. I looked out for the drainage everywhere.

Q. So that while that is in substance a surface aqueduct, it has stood for twenty years and more the run of all the dangers of cloud-bursts and mischief from the public enemy and whatever else might happen to a surface tunnel?—A. It has never met with any accident.

By Mr. RYAN:

Q. How do you provide against injury from violent rains?—A. Rains gather in the levels, but I made very abundant culverts for the passage of the water. I also had as a guide the experience of the engineers of the Chesapeake and Ohio Canal, which lay everywhere below me and near the river, and I had with me at the time an engineer named William H. Bryan, who had spent many years in the construction and preservation of the Chesapeake and Ohio Canal, and he knew more than any other living man, I suppose, about what the action of the

water was in that stretch from the Great Falls to the city, and his advice as to all the culverts over the same streams that the had to be provided against. The canal culverts had sometime troublesome; they had sometimes been blocked up and caused age; so that, by using Mr. Bryan's experience and my own jud as to the size of the culverts, I also gave enough addition to p against damage by floods, and the result has been that we neve broken culvert from that cause.

By the CHAIRMAN:

Q. What did you say was the expense that you estimated or now estimate per running foot for a grade tunnel?—A. About running foot.

Q. What would be the expense of what I will call a surface co following the contours of the hills, and built just as you built the over ditches and so on?—A. About the same. At a moderate and for a short distance the cutting of the tunnel would not co more than the cutting of ground; it is only when you get to a depth and for a long distance that tunnel excavation is so costly

Q. As regards the convenience of access and quickness of re case of any accident, which kind of aqueduct would be the bes The nearer the surface the easier it is to get at.

Q. How did you contemplate crossing Rock Creek?—A. I co plated crossing Rock Creek by a wrought-iron pipe. I thou would be well in this case, instead of spending a large amount of in building a masonry arch or bridge across there, to take a le of the experience and ingenuity of our California and Nevada m where they run a thin sheet-iron or plate-iron pipe across a ravin feet or more riveted together, like a piece of stove-pipe in fact. carried plates of iron on the backs of mules to the place where w rolled them up and put them together, and of course the joint not very tight; so they would throw in a bucket of bran or sho the upper end, and in a short time that would choke up the joint make them perfectly tight.

I have seen two or three of those lines, and if you have been t fornia you have seen them in crossing the Sierra Nevada Moun where they would cross a deep ravine and apparently not leak a They last for a certain time, and they are very cheaply repaired. has been done, not only in America. There is a siphon of that k France which carries the water to supply a canal. It carries the across a deep ravine some 2,000 feet long, and instead of makin large pipe, as is proposed here, they made two. I proposed putt a pipe like that of a western steam-boat boiler, supported upon line of masonry, but descending the slope of the hill and crossing Creek on an arch high enough above to allow carts to pass under and reach the hill on the other side. At College Branch and, I at Foundry Branch, I find, on looking over my notes, that I prop similar pipe, but that was on grade. I think I can send you that

The CHAIRMAN. We would like very much to see it.

Q. Have you ever visited the present new tunnel?—A. No, sir

Q. In a tunnel of that depth and in that nature of rock, as y derstand and know it to be in fact from your knowledge of the g here, what would be a suitable and safe means of lining such a so as to make it hold water?—A. The simplest way of lining i course, to line it with masonry, using the stone that you find tunnel, if it is hard enough to stand it. That is what I did with

of my tunnel. Where the tunnel did not furnish stone hard enough I used brick, and backed that with cement masonry, or any stone found in the neighborhood. I used brick and stone indifferently in lining the conduit from the Great Falls down. Wherever in digging the conduit we found plenty of stone we used that, and when we did not we used brick.

Q. Did you have any difficulty in backing this lining solidly so as to make a continuous bearing point?—A. I never heard of any difficulty. A large part of the tunnels which I built, which were all short, required no lining. The pressure was not very great, only 10 or 12 feet, and I did not anticipate that the leakage would be sufficient to be troublesome.

Q. And there was nothing in the nature of the surface water in the neighborhood which would make it necessary for purposes of health or cleanliness to keep water from percolating into the tunnel?—A. All the water that percolates into the tunnel is that much gain.

Q. Because it is good water?—A. Good water, purer than the river water. In the twenty-odd years since I built that tunnel I have heard of but one rock falling, and that was in the long tunnel near the Great Falls. I remember that in one annual report it was said that it was necessary to remove one block of stone which had fallen from the roof.

Q. Of course you understand something of the nature of the present tunnel from information?—A. Something.

Q. Suppose that this present tunnel is substantially a straight line deep down in the rock; suppose this tunnel to be now in the condition that from the nature of the rock you understand it to be; and suppose the lining which has been put in turns out to be absolutely defective as a whole, so that nothing can be done with it in its present situation, and that it must be taken to pieces; taking that to be the present situation, what do you think is the best thing, in point of ultimate practicability and safety, in the matter of ease of reparation in case of any accident, etc., for the public authorities to do?—A. Well, I am not prepared to believe, until it is proved, that if you should turn the water into that tunnel it would leak out so fast as the public seems to apprehend. Take Rock Creek, for example; that flows about 19,000,000 gallons a day. Its minimum is about 4,750,000 gallons. At the time I made these surveys I gauged that stream. It flows for 25 or 30 miles. I do not know its exact length, but I think it is 25 or 30 miles. It flows over this very same geological formation, and it discharges 19,000,000 gallons of water in a day into the Potomac River on the average. If it was very leaky a large portion of the water would sink into the ground. I have seen streams in Virginia that go under a mountain and come out on the other side.

Q. Do you know the area of the surface of the earth that Rock Creek drains, so as to form a computation of the total amount of water that ought to flow out of Rock Creek, supposing it did not leak a bit?—A. No; I have never calculated that. But for the Little Falls Branch, as we call it, on which the upper reservoir is situated, there are about 4,000 acres. I have not looked up its gauge, though I think I did gauge it, but I remember considering that we could count upon that giving us about 3,000,000 gallons a day on the average into that reservoir from 4,000 acres. The general estimate of the amount of water from gathering ground is about 50 per cent.; one-half sinks into the soil and evaporates, does not run off.

Q. Assuming the fact to be as I have stated in this question about the present condition of this tunnel, assuming that the brick-work is

useless, upon the theory of its not standing pressure from the when it is first filled, and so on, are you prepared to express an o as to what is the best thing to do?—A. I would open up the top it in with a good backing. That would be a good deal cheaper build a new tunnel or new conduit; at least I think so. It is d to make a new lining of brick-work. I have seen some discuss Captain Hoxie's idea of lining that tunnel with concrete, and I th opinion of United States engineers was that that was impract My experience in the use of concrete does not lead me to agre that opinion. I think it could be lined with concrete.

By Mr. RYAN:

Q. If that is so, the lining that is in there and the packing co be utilized for that concrete?—A. Yes, sir; and the bottom is fil There is no danger of the bottom bursting. The only danger is arch bursting. That is the only place where a man is tempted lect his work. It is a miserably damp and foul place, and any man will get out of it as soon as he can; and then there is the t tion on the part of contractors, overseers, and workmen to negle work, and also to make as much money as possible out of it. was the same trouble in regard to the Croton aqueduct.

By the CHAIRMAN:

Q. By what process is this concrete lining built to the surfa rock tunnel, which is, of course, very irregular, with cracks an the water trickling in. How do you get your concrete to stay roof until it is set, with the water coming in from the outside?—A in a center of wood just as they do for brick lining, and then tak concrete a bucketful at a time and tamp it in solidly. There is n culty about it.

Q. Even with water coming in?—A. Even with water comi There is no great quantity of water coming in. How much d pump out of that tunnel per day?

The CHAIRMAN. That is one of the things we have been try ascertain.

The WITNESS. They know how much each pump delivers in a time. If they do not know, they could easily ascertain by mak experiment. But that is not the measure of the leakage of the duct when full, because the water which comes into the tunnel w is full has not the pressure which the water in the aqueduct have. Still it is an indication of the degree of porosity. Ther trouble with it.

Q. I am speaking with regard to the mechanical practicab getting your cement to set when the water was coming in throu cracks from the outside.—A. There is no trouble. Quick-setting would set.

Q. Done in that way, I take it, it would be true, of course, that ming would be substantially impracticable, for when the center taken down you could see whether it was well done or not, cou not?—A. No; they might put 2 feet on the top of the center a leave a vacuum. In the Baltimore tunnel they found some trou excavating 100 or 200 feet below the surface, but that was onl and there.

Q. The Baltimore aqueduct tunnel is a grade tunnel, is it no It is a grade tunnel, but in places it is 200 feet below the surfac

Q. But the water does not go through it with high pressure o head?—A. No; that is the mistake in this tunnel.

Q. So that the Baltimore tunnel is practically like the one you built the Potomac?—A. Yes.

By Mr. RYAN:

Q. In regard to the cost of this concrete lining, would that be of s cost than solid masonry?—A. We consider that concrete work can done by unskilled workmen at $1.50 to $2 per day, whereas brick-asons would cost $4 a day. That is what makes the difference in ice.

Q. You would regard a concrete lining there as being sufficient for actical purposes?—A. Oh, yes. Let me say that I put a concrete ndation under the portico at the south end of this Capitol just before e war. I came here when they were excavating for these terraces, d I found 140 feet in length of concrete lying about 10 feet below the ace where it had been put in, two places only, one place 70 feet long. believe you might put it up like Cleopatra's obelisk, on end.

Q. Do you know anything about the tunnel that was originally con-ucted at Chicago, under the lake, for the water supply of that city?— I read about it. That is cut through clay.

Q. What is the lining?—A. Brick.

Q. Was the first brick-lined, or the second one? I had understood at the first was concrete and the second brick.—A. I will not say, sitively, but I have read about it; I have read everything I have seen print about it, and my information is that it is all lined with brick. icago is not in a stone country, you know; it is a brick country.

Q. Has either of those tunnels ever failed, that you are aware of?— No; not that I am aware of.

Q. They go out a considerable distance under the lake?—A. I think y go out 2 miles; no less than 2 miles. There are two or three tun-s there now, and there is another one at Cleveland.

Q. Can you tell us how much below the bottom of the lake the tun-is?—A. I do not remember; it makes no difference, though.

By the CHAIRMAN:

Q. Are you able now to give us any idea of what the cost of a con-te lining would be per running foot, with this tunnel in the condition t I have described it?—A. I think it ought to be made for $6 or $8 ubic yard.

By Mr. RYAN:

Q. I suppose that if concrete lining should be adopted they could com-nce at the end of the tunnel, or at any particular place, and use the ng that is there, break that up and make concrete out of it?—A. t is perfectly good material; there is nothing better than broken ck with which to make concrete work. There could certainly be no asion to take up the lining below the middle line of the tunnel.

Q. Of course you would need to take out all of the lining that is there replace it?—A. I think it can not be possible to take any out of the er part of the tunnel, but only the arch. From the accounts and de-ptions I have read in the newspapers in regard to this tunnel—I can swear by everything I see in the newspapers—they indicate that the r of the tunnel is not lined.

By the CHAIRMAN:

Q. It is not, except in places?—A. If the floor is not lined why is it essary to line the sides? The floor is as leaky as the sides. If the crete is enough to keep the bottom from leaking, it is enough to keep

the roof from leaking. Let me say, in regard to tunnels, that always found every time I began work on them that, where the so solid and sound as to stand of itself, the cheapest way to reme leakage, if I found a crack of an inch or so, would be to point with cement mortar; send a mason there with trowel and a b mortar and let him point that. No possible pressure of water ever drive that cement mortar out when once hardened, and it wo sealed up forever. It would not be necessary to line it. I onl lining work in tunnels where I fear that the roof might fall in. no great apprehension of leakage.

Q. And you, as you have already stated, had no occasion up t guard against the incoming of water from the ground, because ever came in was good water?—A. Yes; there is no occasion t out the springs about this country. The water from the Smith which is brought to this building, was used by the Coast Su testing their standard weights and measures. There were only seven or eight grains of foreign matter in a bushel of water fr Smith spring.

Q. Where is that Smith spring?—A. It is in the middle of t reservoir.

Q. Have you seen the new reservoir?—A. Yes.

Q. Do you know what means have been taken to prevent the of water from that spring underneath washing out the clay, et perhaps causing the whole thing to go to smash?—A. The sp covered over with a brick building, which I understand is inten be tight and to be left there; but when I say I understand th only general inference from what I have seen printed about it.

Q. What outlet is there to that spring?—A. The water fro spring comes to this Capitol Building.

Q. Do you know how much higher that is than the floor of th tol?—A. I guess from 60 to 80 feet; something like that. The rises in the floor of that reservoir. This map will tell you abou

Q. I do not care particularly about that. Do you know an about whether there are any beds of quicksand in that neighb under the new reservoir?—A. Captain Hoxie's reports say that l through quicksand in digging that shaft which is just on the that reservoir; at what depth I do not remember, but his not tell.

Q. Have you examined that new reservoir sufficiently to form ment, as a practical engineer, as to its stability, and whether it is enough, in point of safety, as regards the danger of its giving a any way and proving disastrous from so great an amount of wat ing off at once?—A. The bank which retains the water is abun strong, but if there is a bed of quicksand below no one is able what may happen.

Q. If the water once commences to come, it will all come out fast, I suppose? —A. And then so much of the town as lies in that would go, too. I have always been very much opposed to the b of that reservoir, because it is a very great danger to the city read in the newspapers, once a week at least, of the breaking a some dam which has stood for years, and the water from whic through a village and does great damage. We read the other the breaking of a dam in Switzerland, which filled up the main of a town and killed a great many people; and we read only weeks ago of one breaking away at Callao, or in the neighborh that place, or somewhere in Peru. An earthen bank is liable to

ated by musk-rats, which haunt all mill-dams and streams and amps in this country. If a musk-rat makes a hole through a dam, t is a tunnel which would enlarge very rapidly and be a source of eat danger.

Mr. RYAN. A crawfish will do the same, only in a smaller degree.

The WITNESS. A crawfish does not make so great a hole. A reser- r above a great city is like a powder magazine in a town.

Q. (By the CHAIRMAN.) What was your idea in your suggestion of a ade tunnel?—A. I proposed to stop at the north end of Tenth street, l end the tunnel in a well, lined with masonry, about 30 or 40 feet in di- eter. If water is checked in flowing through a tunnel, there are many usand chances of the tunnel bursting, and if it was not checked it would e until it came up to the level of the source, and then as it was used it would sink, and would fluctuate back and forth. That is all that ecessary.

Q. And then you would tap that well for purposes of supply?—A. I uld tap the aqueduct at about Fourteenth street and at Tenth street, l one other street, I forget what, and bring pipes down to connect h pipes going east and west, and divide the city into three districts— e district embracing all the territory above 90 feet above the river; next one between 50 and 90 feet above the river, and the third one ow 50 feet. The trouble is, not that we do not bring water enough into city, but it is, as you find in your houses, if you draw water in the chen there is none in the attic.

Q. With a grade tunnel, which I will assume for the purposes of this stion, at Fourteenth street, to be 30 feet below the surface, how are to make connections with it there?—A. The water at the end of it e in this terminal cistern, as you may call it, would stand at 140 or .

Q. It is not a question of pressure that I am asking. I am speaking rely of the mechanical contrivances for reaching it there. You uld have a lateral tunnel go out to the ordinary grade with water- es?—A. I would put in a pipe there, and to get at that I would ld a brick or masonry shaft right over the junction, so that I could down to it, and if it was out of order to repair it, and put in a ve there to cut off.

Q. And then you would bring it away to the southward until it uck the other grade of 4 or 5 feet below the street?—A. And bring pipe down to the 36-inch pipe on L street, another to the 30-inch pipe M street, and another to the 12-inch pipe on Pennsylvania avenue, l across to the pipes in the southern part of the city. Then the city ght to be divided into three districts, as I have said.

Q. The same plan you are now speaking of would be equally appli- le, would it not, if your grade tunnel were extended farther east?— Oh, yes.

Q. It would be a question of economy and as to how far east it would desirable to extend it, would it not?—A. Yes; but that was my eral idea.

Q. So that you did not contemplate having a large distributing res- oir?—A. No, sir. When I wrote my letter in May, 1876, I spoke of nall reservoir. It was a comparatively new problem to me at that e, and I had not reflected upon it as much as I have since. When I before Mr. Rollins's Committee on the District of Columbia the En- eer Commissioner then spoke of this reservoir and said he thought estimates were fallacious and that the land for the reservoir would a great deal. Mr. Rollins asked me what I had to say to that. I

said that when I first wrote this letter in May, 1876, I spoke of reservoir and had the idea of an acre or so for the reservoir, since I had thought more of it I had concluded that it was bette have a reservoir at all. We do not need it. We get all the wa comes to that distributing reservoir, and it does not increase th tity by carrying it into this new reservoir and out again, and th ence of the reservoir there is a danger to the city, and so I co that it would be best to make a cistern of a bout 30 to 40 feet i eter.

Q. There would be one advantage in a reservoir, that in case accident at the works there would be a supply of water in the re that would last for a certain short length of time.—A. The su water would last that much longer. We have now about 250, gallons stored, and that is about ten days' supply.

Q. And this reservoir is calculated to hold 300,000,000 gallon lieve?—A. I do not remember. When I say 250,000,000 gallons 250,000,000 above that height which can be used.

Q. Two hundred and fifty million gallons of available water?— available water.

By Mr. RYAN:

Q. Assuming the existence of this tunnel to be in the condi scribed by the chairman, if you were given unlimited discretion struct a water supply for this city, what would you do?—A. T thing I would do would be to turn the water into it and meas flow in at the distributing reservoir and ascertain the amount age. If the leakage was so small as not to be important, I would anything more to it. That is the first thing to be determined. not reason it out at all. We know that the rock is full of seams, it is generally pretty tight, and if the lining has been put in w kind of fidelity there ought not to be any great amount of leakage would not cost much.

Q. Suppose you found it to be defective?—A. Then I woul work to repair the lining.

Q. Then you would utilize that tunnel for that purpose?—A means.

By Mr. MCMILLIN:

Q. Do you think it would be impracticable, in the event that ing had to be prepared, to put a concrete lining within the bric that is already there?—A. That would make it too small; I we it over the present lining; there is a brick arch everywhe pressure in the tunnel is about 9,000 to 10,000 pounds to the squ at the lowest point, equal to 80 or 90 pounds to the square inch. have ever seen a steam-boiler tested, you know what that is.

By Mr. CLEMENTS:

Q. Do you think there is any great advantage in a tunnel ov face conduit as regards strength?—A. It costs nothing to take There was a tunnel built at Naples by the Emperor Claudius al year 400 A. D., and while I was in Europe in 1876 I was curiou those things, and looked into that particularly, making an exam of that tunnel. I learned that during the attack by the Norma Italy all the work of that aqueduct above ground, all its bridg were destroyed in war, and that the peasants, who build their of stone and cover them like ovens, carried off from the aqueduc thing above ground; there was not a vestige of it left except th

reservoir at Misenum, where the Roman fleet lay. That supplied the Roman fleet with water. I made an examination of the tunnel, which lay perhaps 100 feet under the heights for a long distance; saw that it was in good condition, and the engineer who examined it reported that it was in good condition to be used again.

Q. I believe the Croton Aqueduct at New York is merely a surface conduit.—A. The old one is; yes.

Q. The new one that is being constructed, I understand, is to be alongside of that pretty much all the way, is it not?—A. The one that is constructed now is below that, and is merely a tunnel. The one now being constructed was intended to take the Quaker Bridge Dam, but it extends up to the Croton Dam, and is tunneled almost the whole distance.

Q. Do you know why that plan was adopted in preference to a surface conduit, as the old one is?—A. No; I do not. I think it was probably on account of the experience at Baltimore, and the fact that it is out of the way of danger and does not interfere with the grade of the streets, all that part of the country promising to be built over in the future, and it is about as cheap.

TESTIMONY OF GENERAL THOS. LINCOLN CASEY.

SATURDAY, *January* 5, 1889.

General THOS. LINCOLN CASEY, sworn and examined.

By the CHAIRMAN:

Q. You are Chief of Engineers of the United States Army, I believe?—A. Yes.

Q. What is your age?—A. I was born May 10, 1831.

Q. How long have you been an officer of engineers in the United States Army?—A. Since 1852, July 1.

Q. Were you ever connected with the Washington water supply in an official character?—A. I was in charge of the Washington Aqueduct from March 4, 1877, to some day in August, 1882, I think.

Q. I wish you would state in your own way your knowledge concerning the origin of this present aqueduct tunnel business; how it got started, what steps were taken, and what was done, so far as you know anything about it, and particularly how, according to the usual course, the thing appears to have drifted from a quite other plan, in the first place, to the one that has now been actually executed.—A. I think the first definite and determined step to procure an increase of the water supply for Washington was taken in 1879, or some time in the winter of 1878–'79, by a resolution of the Senate. I think it was the chairman of the Committee on the District of Columbia, Mr. Dorsey, who addressed a letter to me, I being then in charge of the Washington Aqueduct, asking my views as to the best method of supplying the need of water on Capitol Hill. That was the section of the city that was then making the greatest complaint at the time. I replied to him, that in my judgment the cheapest way would be to run an iron main from the pipe vault at the distributing reservoir, right through the city, taking the usual course for such pipe, and carrying a pipe up on to Capitol Hill without tapping it to any great extent before it reached Capitol Hill.

By Mr. DAWES:

Q. An independent main?—A. An independent main. I suggested then that it should be 3 feet in diameter. My letter must be among the

executive documents that you have here. If I do not state ev
connected with it, it will be simply because my memory does
me for that purpose; I have not refreshed my memory upon it.
at the same time it was communicated to me that similar requ
been made, by those gentlemen, of the Engineer Commission
District of Columbia, and also of General Meigs, General Mei
the officer who projected and built the Washington Aqueduct,
from the Great Falls to the distributing reservoir. This was
think, in January or the early part of the year; and the thin
to rest then for a couple of years, when Mr. Harris was made
of the Committee on the District of Columbia; and I think s
in 1881 (possibly in the winter of 1881-'82), he addressed simil
to those gentlemen and perhaps to others, and asked me in his
me if I still adhered to the view that I originally had, and if I
what changes I had made in my views. I replied to him that
still adhere to the iron main, but that I would increase its dime
4 feet, making it a 48-inch main; and then I gave him an estimat
I could do it for, and my recollection is that it was about $20
ning foot, amounting in all to a few thousand dollars over
and my impression is that I stated, either in writing or verbal
committee—I was before the committee two or three times, I d
member how many times—that the whole thing could be done
year.

General Meigs's views were published in public documen
how he would bring the water; the views of the District Comm
were also published. Both of those views recommended bring
by a pipe made of brick which should be 9 feet in diameter,
carried along the high grounds north of the city. My views we
about that on one occasion and I said—I think you will find it
the published letters in an executive document—that while I
the plan which I had originally suggested, yet I thought that
when the city became very large indeed and there were immen
tities of water required, that that might be a useful way of br
in. But the matter of the aqueduct was never referred to me
for any report; none of the plans were ever presented to me
never saw them. Finally Congress passed the act for this in
the water supply, and my impression is that that was passed
1882, and, I think, on the 2d of August, 1882, an order was i
lieving me from the charge of the Washington Aqueduct and a
that aqueduct to Major Lydecker, who was at that time the
Commissioner of the District of Columbia. I have never had
tion as to the tunnel or the conduit itself referred to me official
official report; never on any occasion.

Q. Can you follow the tunnel in its growth?—A. Not from
cial information that I have ever had; only from just such inf
as I would obtain from conversation with others unofficially,
newspaper articles; but the matter was never presented to me
I have never had any official documents other than have been p
by Congress.

Q. Did the two plans, that of General Meigs and of the Commi
contemplate tunneling, or a surface conduit?—A. I think you
from the official reports that the projects of those gentlemen b
templated a conduit of about the same grade as the present
is, 9¼ or 9½ inches to the mile; they never contemplated tun
think. I think you will find it so stated in the official reports.

Q. Did they contemplate a distributing reservoir?—A. The

the District Commissioners contemplated a distributing reservoir, while the plan of General Meigs did not. He simply proposed to bring the water in this conduit, which would necessarily be safe all the time; in other words, it was nothing but a main; differed from an aqueduct not under pressure by the fact that it was under pressure and must necessarily be under pressure; it had to be under pressure because it takes its water from the distributing reservoir; and if you are going to take it from the distributing reservoir you must have a head there to make it go through the pipes.

Q. Is it practicable to build a brick conduit under much pressure?—A. Not under a great deal. The present conduit, which passes from Great Falls to the distributing reservoir, is 12 miles long; all of that conduit from the distributing reservoir up to a point beyond Cabin John Bridge, which is something like 2½ or 3 miles above the distributing reservoir, is full of water; the entire interior space is full of water; while the part from that point to the Great Falls, is not full of water. Wherever it is full of water it is under pressure. Whenever it is full of water, as it goes down hill, it has the hydraulic head.

Q. It is going up hill to that point; that is what makes it full of water?—A. Oh, yes; the point where the conduit starts at Great Falls is something like 9 feet higher than where it empties into the distributing reservoir. The lower part of the present conduit is full of water; therefore there is pressure.

By Mr. McMillin:

Q. What is the greatest pressure there; how much to the square inch?—A. I do not think it is very great; it is about .43 of a pound per square foot, and I should say perhaps it is not much over a pound pressure down there.

By Mr. Faulkner:

Q. How far is it over the surface of the ground from the bridge down to the reservoir?—A. I do not know. Wherever there is an embankment it is covered over sufficiently with earth to stop its freezing, and also to resist whatever pressure General Meigs expected to get. I have also heard General Meigs say, "What is the trouble if it is under pressure? We can fill earth on top; if there is pressure inside, we can put enough earth on top to stop it." You asked me whether it was feasible to do this thing, and I say that in this conduit, a diagram of which I have just sent here to the committee, the parts of it that are to be in embankments, not to be covered with earth, you understand, not to be buried in the earth, where it will get the weight of the superincumbent mass, I propose to put galvanized iron pipe inside of the brick-work to resist the pressure.

By Mr. Dawes:

Q. How frequently?—A. Just continuous almost; very thin sheet-iron, made in bands, and just set into the interior of this masonry. I think in that way it can be preserved indefinitely, even if it should have holes, so that it is all lace-work; you will still have strength enough left to resist the pressure. This conduit I do not think has more than 25 feet of head at any point; it would not have more than 15 pounds pressure on the inside of it at any part of it.

Q. What do you estimate to be the probable cost?—A. The estimate has been made roughly, because we have not been able to make surveys and get at the accurate dimensions, but we have done the best we could with the data that we have, and we allowed a very large mar

gin for contingencies, (20 per cent., which is very large), and we the cost to be $1,300,000, I think it is. You have the letter here.

Q. And what is the time of construction?—A. About two year a half I think it could be done in, because there are twenty poi which you could get at it to do work in different directions from.

Q. That contemplates abandoning everything that has been d this tunnel?—A. I presume it must. I do not know the cost of I merely responded to a call made upon me for such an estimate.

The CHAIRMAN. What Mr. Dawes means is that this new p which you submitted a sketch, etc., would involve the entire aba men of the old tunnel?

The WITNESS. Oh, yes; if you build this you would leave the I presume.

Q. (By Mr. DAWES.) This has no dependence upon the other No connection whatever.

Q. If the Government wants to do anything with the other i liberty to do so?—A. Yes.

By Mr. FAULKNER:

Q. In that estimate did you take into consideration any quest land damages?—A. No, sir; the call requested that I should not. line of it, you will see, has been run as much as possible upo streets; you will see that by the map showing the directions.

By Mr. DAWES:

Q. What does it contemplate at the eastern terminus, at th reservoir?—A. The same that is now built there.

Q. It utilizes that reservoir?—A. Yes.

Q. And the distributing point would be from that entirely?—A

Q. You would not tap it at the streets?—A. Yes; I had made mates for tapping it at Champlain avenue, I think, and at some streets, so that we might, if needed, get mains up to it.

Q. The north and south streets; the important streets?—A. Y think there is only one over in the Georgetown district, and I there are, after you cross Rock Creek, two points where it is co plated to dig down and put in mains to run pipes into the city.

By Mr. FAULKNER:

Q. Is that where the stop-cocks appear on this diagram?—A. is where I put in mains.

By Mr. DAWES:

Q. And this I understand is substantially above the rock, i earth?—A. That is what we think. There is one point where we it would touch the rock as far as the cross-sections which have al been obtained show, but we had no money to enable us to go ou take bearings or make a survey, and we had to take such mater was already compiled.

Q. How much more expenditure would be coupled with it to an aqueduct over the proposed bridge crossing Rock Creek at M chusetts avenue extended?—A. The cost of putting an aqueduc that bridge would increase the cost of the bridge very little, and I a conduit should be brought over that bridge.

Q. You would utilize that bridge as you do Cabin John?—A It could be used very readily for carriages. Suppose Cabin John b was twice its present width and built in the way this is proposed, it not have cost much more. And I think it is still worth the att

f the District Commissioners whether they should not build a bridge t the Massachusetts avenue crossing of Rock Creek that would be seful in this way, and its height would have to be determined by the rade of the conduit.

Mr. MCMILLIN. And hence the building of a bridge there at all until his question is settled ought not to be contemplated.

Q. (By Mr. DAWES.) At the time you were relieved from charge of he Washington Aqueduct was the present plan upon which the tunnel as constructed determined upon?—A. Not that I know of.

Q. Do you know the circumstances under which it was determined pon?—A. No, I do not. I know that after the bill passed, from some ime in July (I think it was the 15th) up to the 2d of August, while I as still in charge of the aqueduct and thinking that I would have to uild it, or possibly might have to build it, I thought something of the natter, without having the plans before me, because, if you remember, hey were made in the office of the Commissioners and had not been urned over to me. I thought something of it, but I never thought anyhing but a surface conduit.

Q. What was the plan you had in your mind?—A. A surface conduit, and that was the one I imagined had been appropriated for by ongress by the act of July 15, 1882.

By the CHAIRMAN:

Q. All the point you understood at that time to be *in dubio* was he *modus* of getting across Rock Creek, was it not?—A. Yes. There ere various views as to how Rock Creek should be crossed, and I had eard some way or other that General Meigs proposed to cross it by eans of siphon pipes. Then I had understood that in the District Comissioners' office they had proposed, instead of iron siphon pipes, to drill vertical hole on one side, a horizontal hole under the creek, and a vercal hole on the other side.

Q. To bring it up to flow again?—A. To bring it up to flow again. hat was the idea that I had understood. But this was all unofficial. low to get across Rock Creek was the *bête noire*, and in my cogitations bout it during this period between the passage of the bill and while was under discussion probably in Congress, and up to the time that was relieved, I had also thought how I would get across Rock Creek I had to do the work, and I had decided on a bridge like that in the lan.

Q. What is the usual course in the War Department and in the office the Chief of Engineers, when a subordinate engineer in charge of ny particular work or set of estimates for any contemplated work, roposes a substantial departure from what has been previously conmplated to some new scheme, in regard to action upon such recomendation of his?—A. First, the subordinate officer in immediate harge of the work—I mean the man who is disbursing the money for e work—if he has any views or any project which would change the iginal project, he must submit it first to the Chief of Engineers; the hief of Engineers must consider the subject and express his views upon e matter, and then transmit his views to the Secretary of War, who ves the final decision as to what shall be done.

Q. Is it, or not, the usual course of business in the Engineer Departent of the Army, when an important new work is to be undertaken or important change contemplated in the way of doing a work is proosed, to have the matter reviewed by what is called a Board of Engieers?—A. Yes, sir; that is the usual custom.

Q. How long has such been the custom?—A. Well, sir, it
the custom since 1816.

By Mr. DAWES:

Q. Does that board come in between the report of a Chief of
and the Secretary of War?—A. No, sir; it comes in betwee
port of the officer in charge and the Chief of Engineers. In 181
of Engineers was organized in the Engineer Department, and t
of Engineers has had a continuing existence to the present da

By the CHAIRMAN:

Q. A standing board?—A. A standing board. It is called t
of Engineers, and it consists of from three to five higher officer
on the Board. It is a continuous board. It does not prevent
tion of a board, but *the* Board of Engineers is different fro
Frequently the amount of business is so great that *the* Board
neers can not consider all the questions that would natur
before it, and so local boards have to be created for the cons
of some of the questions.

Q. Was this affair sent to the Board of Engineers or to an
engineers for consideration?—A. Not that I know of, originall
not in the Department at that time. You could ascertain tha
chief, perhaps.

Q. You mean that you were not in the office proper?—A.
in the office of the Chief of Engineers at the time.

Q. Did you ever hear of such a thing?—A. No, sir; I neve
it being sent to the Board. There have been two boards conne
this work since its inception; there was a board ordered, of wh
the president, upon some matters connected with the reservoi
some matters as to certain slight changes in the construct
That matter is all printed and before you. And then there w
tion as to what kind of lining should be put in the tunnel, an
submitted to the Board of Engineers, and they came on here
York and examined and made a report.

Q. You were not a member of the Board at that time?—A

By Mr. DAWES:

Q. Have you been a member of the Board at all?—A. Yes.

Q. At what time?—A. I was president of the Board of
from the 1st of November, 1886, to the day on which I was m
of Engineers, July 23, 1888.

By the CHAIRMAN:

Q. Who were the members of the Board of Engineers in
1882 and 1883?—A. I could not testify under oath as to th
only say that I think General Tower was one, and also that
Abbott and General Newton, and perhaps General Gillmore w
bers; I do not know.

Q. The records in your office will show?—A. Oh, yes; th
will show.

The CHAIRMAN. I wish you would send to us a memorandu
cially in regard to the time when this matter was inaugurated
length of time.

The WITNESS. Yes, I will do so.

The CHAIRMAN. I wish you would add to that memorand
having made an inspection of your records, information wheth
time during the course of this tunnel work anything about it

ed to *the* Board of Engineers or *a* board, except the two instances have named: one as to the method of lining, and the other in re- l to the reservoir.

he WITNESS. I will do so. (Makes a memorandum.) The mem- ndum I have made here reads in this way: Who were members of Board of Engineers from 1879 to 1883, and were any other questions n the two referred to ever sent to a board of engineers.

he CHAIRMAN. Or to *the* board or to any authority except the Chief ngineers himself.

. Have you ever known an instance, of work of anything like the ortance of this work, that was not submitted to the consideration *he* Board of Engineers or to the consideration of *a* board?—A. That olves a knowledge of all the history of the proceedings of the En- eer Corps for so many years that I could not say; yet it might be sible that we could find a case.

. Do you remember any? That is my question.—A. No, I have no llection of any work of the magnitude of this being constructed out consideration by a board.

. I wish you would tell us what are the comparative advantages disadvantages of a tunnel through the earth (as laid down sub- tially in this sketch which I now show you, and which is marked our number 196), and of carrying a conduit in the nature of the one now exists from the Great Falls substantially along this green line his map marked No. 195.—A. The question that we are investigat- is how to get the water from the distributing reservoir over to the rvoir at Howard University. Remember that the source of supply he distributing reservoir. I do not care how it gets in there. There . That is the source of supply, and you are to carry it to Howard versity.

he conduit that carries this water should of course commence at the ributing reservoir so as to get all the water in it; therefore it must in at the bottom of it. You must not have the end which takes the er out of the distributing reservoir up near the surface of that reser- ; you must have it down at the bottom of the reservoir; it must in at the bottom; that fixes the level at that point. That point is . In order to get a sufficient quantity of water conveyed by the from this reservoir to the reservoir at Howard University you have to give that conduit a certain slope, because when it is level the er will not run, and the rate at which it runs depends upon that e and the size of the conduit. Depending upon those elements will the quantity of water that you can deliver. Now, the distributing rvoir being the source of supply, you must keep the water there as n as you can, keep it at 146, as it is kept to-day.

. Is that 146 the surface or the bottom?—A. The top surface of the er to-day; the surface at the bottom is 135; so that the water is 11 deep in that reservoir. Now, the water at the top of the dam at at Falls is 148. There is only 2 feet of difference in level between surface of the dam and the surface of the water in the distributing rvoir, and that 2 feet of difference in level keeps the water in the ributing reservoir at 146, which enables you to deliver about 000,000 gallons of water per day. But if the city increases in size so t you need more than 30,000,000 gallons per day, you have got to er the surface of the distributing reservoir or you must raise the face at the dam. If you lower it in the distributing reservoir you e got a less head for delivery at Howard University. Therefore the duit which I have suggested on this plan has been drawn in such

a way as to deliver, with the water at 146 in the distributing reservoir, 44,000,000 gallons a day at Howard University. That can only be done by burying the conduit down in the ground, as I have indicated on this plan. Was it your idea to run it along on the surface of the ground and keep an open canal-like conduit?

Q. No; I mean just such a conduit as comes from the Great Falls to the distributing reservoir, which is not an open conduit except at the reservoir.—A. No; it is closed; but it is partly full of water and may be full the whole way possibly. This plan I have drawn on that paper is the proper and suitable one for that purpose. The open, flowing conduit, as suggested in my letter, drawn by the green line, was an open canal, to be 14 feet in diameter, and just like a half circle.

Q. That is not the kind of conduit I am talking about at all. I am talking about the main conduit that exists from the Great Falls down to the present distributing reservoir.—A. This one is similar to that only in this, that you can not have one that is not full of water all the way. It must be full of water all the way; it must be full precisely as an iron main sunk in the earth is full.

Q. In order to keep up the head to get all the water you can?—A. Yes.

Q. The difference between a reservoir on the surface and one down here in that respect is only the difference, is it not, between the height at which you would begin at the distributing reservoir, at the start, and the height of the receiving reservoir? If you begin 4 feet below the surface of the distributing reservoir you can then get a flow which will fill up the same way, will it not, so long as your distributing reservoir is full, just like your dam at the Great Falls?—A. With the water in the distributing reservoir at 146 you can only put in thirty millions a day, unless you raise the dam at Great Falls, and that would throw more of that conduit under pressure and subject it to internal pressure, which might burst it open. There are the difficulties you have; but you have scarcely any difficulty at all in raising the end of it at the distributing reservoir, because you have got to have your conduit low enough to get under Champlain avenue and Seventh street, and that depends very largely on the level of it on this part of the line.

Q. That would depend, like Rock Creek, on whether or not you go under it or cross by a siphon?—A. It could be accomplished by such course.

Q. How much more pressure would you get in the present conduit with the present distributing reservoir kept at the same height that it is now, if you were to raise the dam at Great Falls 4 feet?

The WITNESS. How much greater pressure would there be?

The CHAIRMAN. In the present conduit, with the outlet open just as it is now, only raising the head to increase the rapidity of the flow?

A. You have about .43 of a pound per square inch for every foot of rise.

Q. That is, if there is dead pressure.—A. Yes; a cubic foot of water weighs 62½ pounds; divide that by 144 (square inches) and you get about .43 of a pound to the square inch. But there are great difficulties in the way of raising the dam higher than it is now, 148. You would have trouble again with the flowage of the land on the other side, and you would have great trouble with the Chesapeake and Ohio Canal if you raised the dam higher than it is now. You will see by the appropriation act of July 15, 1882, that one of the items is to re-imburse the Chesapeake and Ohio Canal for certain damages claimed by them to be due by reason of raising the dam.

Q. To come back to the water pressure: You have described what he pressure would be per square inch, making an easy computation or an increase of 4 feet of head. That computation is based upon the dea, is it not, of the amount of pressure if the lower end of your conduit was stopped so that you caught that weight of water?—A. Yes.

Q. Would not that pressure be diminished if the lower end was open so that the water should flow out into the distributing reservoir?—A. Yes; because then you would not have the difference of level.

Q. So that it would follow that if you raised the dam at Great Falls 4 feet, say, you would increase the pressure by the amount already in he conduit?—A. Yes.

Q. The result would be, then, that, given a sufficient supply of water at the distributing reservoir, there would be no difficulty in carrying it, by a conduit analogous to the one from the Great Falls, following the contours of the hills, and waving for the moment the question of crossing Seventh street, to this new reservoir?—A. I think you ought not to start any higher at the distributing reservoir than I have mentioned, 135; I think you ought to begin at that level, the bottom of it.

Q. Why is that? Why would not 4 feet below the surface be sufficient?—A. I do not know exactly what quantity of water would be delivered from the distributing reservoir by taking the water from a line 4 feet below 146, that is 142, with the head at 148.

Q. I am proposing to have the bottom of this outlet into the new conduit 4 feet below the present surface. If you put in water as fast as it goes out, the level will remain just where it is, will it not?—A. Yes; but that you can get at by raising the water at the dam.

Q. And if you take it out faster, you have got to have it come in faster?—A. Yes, sir; you have got to have it come in faster.

By Mr. FAULKNER:

Q. You have a greater body to draw from?—A. Yes. It is a very intricate problem. The truth of the matter is, that you must take into this distributing reservoir as much as you take out, or else the water will fall; if the water falls the pressure diminishes, and you want to keep that as high as possible, because if you put in this conduit you are still getting a supply from the pipes all through the city that come from there now, and you want to get all the benefit from that that you can.

Q. I do not think you have fully answered the question of the chairman in regard to the advantages and disadvantages between the system proposed by you and drawn on this map, and that of the present tunnel system, if the present new tunnel be thoroughly lined and filled by a proper backing.

Mr. DAWES. The chairman had him compare it with a surface canal. He did not ask him to confine it to this.

Mr. FAULKNER. I understood him to confine him to this. (To the witness.) What was you understanding of the chairman's question?

The WITNESS. I think that Mr. Dawes is right about it. He wanted me to compare what I had drawn on that map there with one that would be higher up, nearer the surface of the ground.

Q. Have you answered a question of that kind?—A. No, I have not. I have not answered any question as comparing it with the one down in the tunnel.

Q. I will ask you that question then: State to the committee the advantages and disadvantages of the proposed plan suggested by you in Map 196 and the present tunnel as it now exists, as respects the distribution of water from the old reservoir, supposing that to be properly

constructed?—A. The advantage of one nearer the surface is t
can be readily and speedily emptied in case of any trouble w
That would seem to agree with the general principle of any tub
is bringing water to supply a large city, that it ought to be in s
position that it can readily be got at in case of difficulty. The
one, even if properly constructed so that it is perfectly tight, is l
deeply in the ground, and has a number of pockets in it that
possibly silt up, and if anything occurred which required it to be
tied it would probably take two weeks to do it, because all the
that is in this conduit below the level of Rock Creek would have
pumped out, and it would require large pumping engines to
This is based on the supposition that both conduits are to be per
tight. I think it is bad engineering and bad principle to put it
down in the ground in that way. Then the shafts and holes le
from it vertically have got to be secured in some way, in some p
like that at Rock Creek, which is subject to tremendous pressu
the time. Engineering methods may protect all that. Neverth
here is a structure that is being constantly subjected to that.

Q. The pressure is very different, too, in the two methods of con
tion?—A. Oh, yes; the pressure in the one that is proposed nea
surface could not be more than 15 pounds to the square inch any
in it, while this one down below is 80 pounds to the square inch in
cases—as much as there is under a steam-boiler.

By Mr. DAWES:

Q. Is there any necessity of pumping, under certain contingenc
Rock Creek which would require the maintenance of a considerab
tablishment there always in readiness?—A. I should think so
then you have got to have somebody there to guard it all the time
to keep it oiled and in readiness, because you do not know whe
may have to use it.

By Mr. FAULKNER:

Q. Have you personally examined the character of the ground
forms the bottom of the new reservoir?—A. Yes; as a member o
board I went over there and saw some of the places in it where
were said to be deposits of muck and all that sort of thing; they
all to be dug out and filled in with puddled clay; that was to b
way in which that was to be fixed.

Q. Did you see any evidence of a sort of quicksand character o
tom there?—A. There was sand there, but I did not see anything
shape of quicksand; I did not examine it sufficiently for that.
went to those muck places. My report as a member of that board
be found somewhere among your papers.

Q. I have some information to that effect, and that is the rea
ask you as to the character of that bottom; whether in your judg
it would be safe bottom, considering the way it is constructed, i
knew how it is constructed at present.—A. I have not been over
since the bottom has been fixed.

By Mr. DAWES:

Q. Is there any possible danger, to be taken into considerati
the breaking away of that reservoir?—A. Yes, sir.

Q. Will you describe that element?—A. I regard it as a sort of n
to that part of the city to have a reservoir holding 300,000,000 g
inclosed by an earthen dam. It is true that it has a very thick
made of puddled clay, a very large part of it, but I know that th

here, around Washington, is very treacherous. I know that it will wash around our sewers and make great holes in the ground, so that the surface of the streets caves in. And as long as the ends of that dam yonder are rooted in the hills it is a possible thing that the water might burrow in, or a muskrat dig a hole through the bank in some way and let water through, and then the first thing you know the water will rush through, and away goes that part of the city.

Q. What would be the probable consequences to which the city would be exposed?—A. I think all the houses between the end of that valley and the Botanical Garden would be swept away. The course of the water would probably take the valley of the old Tiber Creek, which is below that, and it would sweep things away pretty well in that valley. General Meigs's plan never contemplated a dam, and he stated in his letter to the chairman of the committee that he regarded it as a dangerous thing.

Q. Do you know who is responsible for the recommendation of the reservoir?—A. No, sir; I do not know anything officially about it.

Q. What has that reservoir cost?—A. I do not know; I have not been in charge of the thing long enough to know anything about that.

Q. Is it completed now?—A. I do not think it is now.

Mr. FAULKNER. I think the embankment is completed.

The WITNESS. I think they are riprapping it on the inside; I think there is a great deal of work yet to do upon it.

Q. The plan upon the map No. 196 contemplates, does it not, the use of the present reservoir?—A. Yes.

Q. Can you suggest any method by which that plan can be utilized without the reservoir?—A. It can be stopped at the end where it would empty into the reservoir, and terminate in a small cylindrical reservoir, say, that would enable the water to rise to the same height that it is in the distributing reservoir.

Q. If that plan should be adopted how much would that diminish the danger of casualties from the breaking away of it?—A. If you do not use the reservoir at all it would diminish the danger entirely.

By Mr. FAULKNER:

Q. That could be shut off at any time that any break might occur?—A. Yes.

By Mr. DAWES:

Q. This plan in 196 could be utilized in both ways, could it not?—A. Yes; you could empty it into the reservoir or cut it off.

By Mr. FAULKNER:

Q. Will you state to the committee what was the original plan of General Meigs for conveying water from the distributing reservoir, and also how that plan was carried out subsequently?—A. The original works, planned by General Meigs at the distributing reservoir, contemplated four 48-inch mains to bring the water into the city. In the pipe-vault which he constructed are the necessary openings for four 48-inch mains. One of these openings had a reducing piece on it from which a 12-inch main is carried out into the city and along Pennsylvania avenue. The second opening is tapped for a 30-inch main, which passes by the same route to Rock Creek and then through K street. The third is tapped for a 36-inch main, which passes across Rock Creek and passes through L street. These are the only mains now supplying the water to the city. The fourth opening is without any main attached to it.

Q. Please state the capacity of those several pipes and ho additional water could be brought into the city by attaching a main to the fourth opening.—A. If the fourth opening was att a 48-inch main, it would deliver in the city about 27,000,000 ga twenty-four hours, which is about the same amount now deliv the three other mains mentioned.

Q. What would be the effect of running that 48-inch main f reservoir to Capitol Hill, as regards the supply of water upon t ground?—A. It would give to Capitol Hill all the water requir in all the houses.

Q. As I understand, this was somewhat the plan suggested in 1879 to 1882?—A. Yes, sir; this was the suggestion that made. My estimate for it at the time was about $600,000, or running foot.

Q. Have you had any reason, subsequent to that report and e to change your opinion as to the feasibility of that plan?—A whatever.

Q. Along what route did you suggest that that 48-inch main be carried?—A. After crossing Rock Creek it was to take t ground in the northern part of the city and reach Capitol Hill way.

TESTIMONY OF JOHN V. QUACKENBUSH—Recalled.

TUESDAY, *January* 15,

JOHN V. QUACKENBUSH was recalled and further examined.

By the CHAIRMAN:

Q. You came to me some time ago and communicated to me, a had been examined before, that you had just learned that the some fictitious names in the time-books?—A. Yes, sir.

Q. How long had you known it at the time you told me couldn't say whether it was one, or two, or three days.

Q. How did you find it out?—A. By going home and inquirin it. I inquired of Mr. Palmer, and Mr. Heitmuller after inquiring Palmer; Mr. Palmer told me.

Q. What led you to inquire of Mr. Heitmuller?—A. From th tions you asked me. I asked him if there were ever any fictitious put upon those books under Palmer & Emery's administration.

Q. That led you to make the inquiry?—A. Yes, sir.

Q. You first inquired of Palmer?—A. I wouldn't be positive it was Palmer or Mr. Heitmuller.

Q. Try to remember that, in order to be exact about this busi A. I couldn't be positive, Senator; I wouldn't be positive.

Q. Where was it?—A. I think it was in the office.

Q. Your office?—A. Yes, sir.

Q. Who was present?—A. I couldn't say.

Q. You can not remember?—A. I could not; I couldn't say Mr. Clark was there or not.

Q. What did you say to Mr. Palmer?—A. That I couldn't say mean how I introduced the question?

Q. Yes. Just tell us what you said to him, as nearly as you c sibly recollect.—A. I think I asked him whether there were a

names put upon the books, and he said that these men that had
ed extra pay, as I remember, were entered up in fictitious names.
Did you know that any of the men had received extra pay?—A. I
ot; no, sir.
What men did he say had received extra pay?—A. I didn't ask

You did not ask him?—A. No, sir; it was enough for me to know
ictitious names were entered up there.
You say that he said that those fictitious names were covers for
who had received extra pay?—A. Yes; for extra time.
Did he not mention anybody that had been working extra time?—
didn't ask him who they were.
Did he say anything about it?—A. I don't think he did, because
t think I asked him.
You had not curiosity enough, when you found that the books had
falsified, and fictitious names put in for somebody who had been
ing pay for extra time, to ask him who those somebodies were?—
o, sir; I was so disgusted with it that I said no more about it.
Did you ever have any conversation with any body else on the
ct?—A. No, sir. I might have had an interview with Mr. Leroy.
You "might have had;" but did you have?—A. I wouldn't swear
vely that I did; and really I wouldn't swear positively that I did

What do you think about it?—A. I think it is more than likely
did have something to say to him.
Have you any recollection of any such circumstance?—A Not
ve; no, sir.
Have you any kind of recollection?—A. I think I have; yes, sir.
State what it is.—A. I think I talked to Mr. Leroy, and asked
ow that was, and he said he knew nothing about it. The remark
e to him was that I asked him how he came to allow anything
t kind to be done.
And what was his reply?—A. His reply, I think, was that he
nothing about it.
What did you say then?—A. Well, I said it was very strange that
things were going on and nobody knew anything about it.
And what did he say then?—A. I can't make the remark, what
id, only that Mr. Emery and Mr. Palmer—that the books were
—and he thought as long as the money went to them it was none
business; that as long as the money was due to them they were
verdrawing their account.
What do you mean by saying that the books were Emery &
er's?—A. The time-books were their books for the men that worked
em.
Were they not kept by your book-keepers?—A. No, sir; they
kept by the time-keeper, and he received pay from Palmer &
y for doing it.
Who was that?—A. Albert Heitmuller.
He was not in your employ then?—A. Yes, he was; he was in
mploy, but he received extra pay for doing that.
Leroy was in your employ too, was he not?—A. Yes, sir.
How much extra pay did Heitmuller receive?—A. I learned that
t $10 a month.
And how much did you give him?—A. Sixty dollars.
What were Heitmuller's duties under you?—A. Time-keeper.

Q. Keeping time of what?—A. Of the men in the tunnel; of in the excavation, and all the men on the line.

Q. Did that include the men who were employed by P Emery?—A. I know he did keep time.

Q. Would not that have been a part of his duty for you?—A. it was my instructions that our men should see that those m paid, so that they could not go back on us for pay.

Q. Those being your instructions, it was a part of Heitmull ness for you, was it not, to keep the time of those men?—A. you might consider that it was.

Q. You were bound to see that they had their pay, were yo A. Certainly, I was, because I would be responsible for the they hadn't got it.

Q. It was your money that paid them, was it not?—A. Yes

Q. It went from your office?—A. It was their money due th

Q. But before it was paid to them it was your money, was i A. Yes, sir.

Q. And you did not pay it over to Palmer or Emery?—A. S was paid.

Q. But I am speaking of the pay of the men.—A. I say th opes were sometimes passed to Palmer & Emery or to Palmer nan.

Q. Why was that?—A. They didn't come across the men handed them the envelopes to pay their own men.

Q. Are you speaking of what you know of your own know A. No; only from what I have heard.

Q. Did you have any conversation with Heitmuller after learned that there were fictitious entries in these time-books?— sir; I did, I think.

Q. What was it?—A. I asked him how he came to enter th names, and he said it was Mr. Palmer's instructions, if I recoll

Q. What names did he say were entered?—A. I didn't ask

Q. Did he say?—A. I don't think he did; no, sir.

Q. Did you make inquiry about who had got the money or resented by these false names? Did either you or he make inquiry?—A. Mr. Heitmuller, you understand, didn't pay the

Q. I understand that; but my question is, what he said to what you said to him. Did either one of you mention the anybody who had actually got this money that appeared aga ple's false names on the books?—A. From my recollection I th said Mr. Palmer got it.

Q. You mean by that that these false names were intended sent Palmer?—A. No; I mean that the envelopes that this m put in were handed to Palmer.

Q. But I am asking you whether you or Heitmuller, during t versations about these false entries, ever mentioned the nam persons who were to have the money that you understood wa the envelopes and addressed to false names?—A. No, sir.

Q. You did not learn during all that conversation and inqu I said before, Senator, I didn't inquire; I was entirely disgu any such arrangement. If the men were entitled to the mone them why their names wasn't put down as that, and if they entitled to it why they put down some other fictitious names.

Q. But in that conversation, and inquiry, and your disgust ing of these false names, neither you nor any of these people are complaining about with reference to the business, menti

ame of any person who was to have got or did get this false money?—
. Not to my recollection; I couldn't say as to that positively. I
ouldn't state whether there was ever a name mentioned or not.

Q. You could not state positively, do you mean to say?—A. I couldn't
tate positively.

Q. State as nearly as you can, then.—A. My recollection is, as I said
efore, that I heard of Lucas getting pay for overtime.

Q. Have you any recollection that Lucas's name was mentioned in any
f these conversations between you and your people in regard to these
alse entries?—A. No, sir.

Q. You have no recollection at all?—A. No recollection of it.

Q. Have you any recollection of any of the other inspectors' or subin-
pectors' names being mentioned?—A. No, sir.

Q. Have you any recollection of any officer's or superintendent's name
eing mentioned?

The WITNESS. Being mentioned as getting pay?

The CHAIRMAN. Yes.

A. No, sir.

Q. So, then, in all this conversation——A. This conversation was not
f very long duration, you understand.

Q. Did it all take place at once?—A. It took place at once with Mr.
'almer, and afterwards, I think, with Mr. Heitmuller.

Q. And afterwards with Mr. Leroy?—A. Well, I don't know, but Mr.
eroy might have been there at that time.

Q. What do you think about it?—A. I couldn't say, because I didn't
hink it made any particular difference, and I didn't place my memory
pon it.

Q. Then you mean to swear, do you, that in all these conversations,
e they many or few, that you had with Palmer, Leroy, Heitmuller, or
nybody else, when you made this discovery, as you say, of this false-
ood that had been carried on, you have no recollection that the name
f any one of these inspectors or anybody else in connection with that
oney was mentioned?—A. Not to my recollection; no, sir.

Q. Did you ask either of those people why they covered it up with
hese false names?—A. I told you I asked Mr. Heitmuller; and also I
aid, as I say now, that Mr. Heitmuller said that Mr. Palmer had told
im to do so, and he done it; I think that was the conversation, and
Ir. Leroy said he knew nothing about it.

Q. What did Mr. Palmer say?—A. I never said anything to him and
Ir. Palmer.

Q. At the time you did speak to him, did you not ask him why in the
orld it was, if all these inspectors were being paid for overtime or
eeping time, that their names were not honestly entered in the books,
r why they were covered up?—A. I think I did.

Q. What did he say in reply?—A. If I recollect aright, he said that
hese men did not want their names upon the books, or something to
hat effect. Now I think he said that Albert Heitmuller had said that
here had been some inspectors receiving pay for overtime before. I
hink that was Mr. Palmer said that to me. That is as it strikes me
ow, when it is brought to my memory—that Mr. Albert Heitmuller had
aid so, that men had received pay for overtime before their names had
een entered down; and then when I spoke to Mr. Heitmuller about it
e said that it was no such thing, that he had not said so; he disputed
.

Q. Did you have an inspector or subinspector named Harper?—A.
did; yes, sir.

Q. Where was he employed?—A. At Howard University.

Q. Was that when you were putting in the lining or making cavation?—A. It was both; we were doing the excavation an both at one time.

Q. What year was that?—A. I think we commenced there I don't recollect the dates; but we were certainly putting in t vation and lining both at one time.

Q. Was that when you were making the dry packing or mort ing?—A. I won't be positive whether Mr. Harper was there were doing the dry packing or not.

Q. Did you not do what dry packing was done before you cement packing?—A. Yes, sir.

Q. You think that Harper was not an inspector.—A. I say know whether Mr. Harper was an inspector there at that time I think it was Lucas and Chadwell.

Q. What is the kind of packing at Howard University?— packing and masonry both.

Q. That was under the contract which only called for dry was it not?—A. Oh, no; under the contract that called for dry they put in dry packing, and then afterwards mortar was inclu

Q. That was under the last contract, was it not, except the tension?—A. I think there was mortar put in, not under the tirely, but under the second.

Q. Do you know where Harper is now?—A. He is somew work in the city.

TESTIMONY OF ALBERT HEITMULLER—Recalled.

TUESDAY, *January* 15,

ALBERT HEITMULLER was recalled and further examined.

By the CHAIRMAN:

Q. I want to ask you again, in view of further information have, about this matter of these false names in the books, and you to be very careful in order to be sure that you will state will stick to in connection also with what you said before the court of inquiry, if you were examined there. Who first spok about these false names in these books?—A. As far as I can r. Palmer.

Q. What did he say to you?—A. I couldn't recollect every w

Q. State the substance of what he said.—A. The main obj the allowance of overtime.

Q. Could you not make an allowance for overtime witho names?—A. Well, I don't see how I could.

Q. Could you not get on by telling the truth about it in the b A. No; I don't know.

Q. Why not?—A. I don't know; the object of these names told you before, in case so that the laborers wouldn't know men was watched by inspectors after the day's work.

Q. How could the laborers know what the entries were books?—A. The laborers could not, but it could be found by envelopes.

Q. The envelopes were not given to the laborers, were they as each one was entitled?—A. Most of the men, after they w ceive their money every week, they would count it and throw

es down, and very often some fellows like colored fellows would
up everything.
When did you first have any conversation with Mr. Quackenbush
these false names and this overtime business?—A. A little after
eginning of December.
Where was it?—A. At the office.
Who began the conversation?—A. Mr. Quackenbush.
What did he say?—A. He said he heard it from Mr. Palmer, and
ked me if there was any overtime put in under assumed names.
What did you reply?—A. I said yes.
What names did you tell him were put in?—A. Mr. Quackenbush
t ask me no special names.
I asked you whether you told him?—A. I did not.
Was that all that was said between you and Quackenbush?—A.
Quackenbush asked me what was the reason I didn't speak to him
it before.
What did you say?—A. I told him that at that time when this
ork started Mr. Quackenbush wasn't here, and Mr. Brennan and
er had an independent check-roll of their own, and that they gave
e order to put this time in under these names, and I did not think
re than right, because these men were more experienced in any-
like that than I am, so I just acted according to order. That is
nswer I gave to Mr. Quackenbush.
Did you not tell him the names of the persons who were really
t to have the money?—A. I don't recollect that I did.
Did you tell him what were the false names?—A. As I told you
, I don't know if I told him all the names; I told him there had
some names put in.
Do you remember whether you told him any of the false names?—
don't remember.
Did he not ask you who these persons were really and what the
names were?—A. As I said before, I couldn't say, for sure,
er he did or not.
What do you think about it?—A. Most likely I think I gave Mr.
enbush an answer in some way or another.
Do you think now that you mentioned to him the name of Lucas,
stance?—A. I might and I might not.
I asked you what you thought.—A. I thought I might; that I told
uackenbush.
Have you any remembrance about it?—A. No not so certainly
could say positively.
Are you sufficiently certain to say that you have an impression?—
am.
What is your impression?—A. That I told him.
Have you any impression that you mentioned the names of any of
her inspectors?—A. I have.
What ones?—A. We were speaking about O'Brien.
Who else?—A. I don't know if Mr. Quackenbush asked specially
any other names.
Did you state about any other names, whether he asked especially
?—A. I say there is some other names, but I didn't mention no
s to Mr. Quackenbush.
Did not mention any names?—A. No.
I thought you just said that you mentioned Lucas and O'Brien?—
nean not that I didn't say any more names besides Lucas and

Tom O'Brien. I say there is some other names, but I don't t
Quackenbush asked exactly or inquired and wanted to kn
much more or what names; but I told him these two names, a
is some others. I don't remember exactly if there was any fur
versation.

Q. Who were the other ones you did not mention who had
ceiving money in this way?—A. As I say, as far as I rememb
Wood or John Woodward and an inspector named Thomas.

Q. What false name stood for Thomas?—A. Stone.

Q. What false name stood for S. A. Harper?—A. I know
about it; I don't know any name about Harper, because Harpe
working.

Q. Was not working when you kept books?—A. No, sir.

Q. Do you know for whom the false name of John Smith
tended?—A. It was for different persons.

Q. For a different person or for different persons?—A. For
persons.

Q. Who were they?—A. I don't know.

Q. How do you know that it was for different persons, th
Because, first, I put in John Smith, and because there were
four different names I retained it.

Q. You first put in John Smith for whom?—A. For McNam

Q. Then whom did you put him in for next time?—A. I kept
Smith for McNamara.

Q. Did you not use John Smith for anybody else?—A. Aft
was more overtime I couldn't use John Smith for other men;
the reason I had to specify different other names for other me

Q. You say you used John Smith to represent McNamara?—
sir.

Q. Was it used for anybody else at any time?—A. I don't k

Q. You do not know?—A. No.

Q. Did you not use it for anybody else than McNamara?—A.
I don't recollect if it was used under different headings at differe
if the name is entered there for a different man, and if it is not
McNamara; I don't know, certain.

Q. But if John Smith appears at different shafts at the sa
then it is meant for different inspectors, is it?—A. Yes, sir.

Q. Whom would it have meant then, at that shaft?—A. I did
the entry and I don't know. I only kept this book since the
we started, and that is the entry I made.

Q. Then do you mean to say that all the persons that John Sm
resented, so far as your personal knowledge goes, is McNama
To my best knowledge, yes, sir; at the last work.

Q. Take the first work?—A. I don't know.

Q. You were not there?—A. I was there, but I didn't have a
to do with it.

Q. Did you not keep books?—A. I kept my books; yes, sir.

Q. Did you not take the time?—A. Yes, sir.

Q. Did you not put down the name of John Smith?—A. No

Q. When did you begin to put that name down?—A. Since
work.

Q. Since the last contract, you mean?—A. Yes, sir.

Q. And before that time the false names that were put down
include John Smith?—A. I didn't put down any false name
and neither John Smith's name before.

Q. You mean to say, then, that all those false names, so far

ow anything about it, were after the last work was begun?—A. Yes,

Q. What year was that?—A. Since 1887.
Q. Can you fix the very time? Look at these time-books, which were t principally by you, and tell us when the first false names began, h your action?—A. (After looking at the books.) On the 15th of ne, 1888, is the first.
Q. What shaft is that?—A. Champlain avenue east.
Q. What is the false name there?—A. John Smith.
Q. Whom did that represent?—A. I don't know if Mr. McNamara or cas was in there at that time. This is 5 hours at 50 cents an hour.
Q That was intended for a different inspector at that time at that ft, was it?—A. Yes, sir.
Q. And you do not know whether it was Lucas or McNamara?—A. , sir. And there is John Night on the same page, for an hour a day six days.
Q. Who was John Night?—A. Tom O'Brien.
Q. John Luke; where did you enter him?—A. This is the beginning it.
Q. Where did you first enter John Luke or Lukes, whichever the fic- ous name was?—A. (After searching a considerable time.) I can't l any.
Q You can not find any other entries of false names?—A. Yes, sir; nd other names, but not John Lukes. It is here, but I don't see it e.
Q. Do you find John Stone, the name you mentioned a few moments ?—A. I find John Wood here.
Q. What date is that?—A. On the 20th of July, 1888.
Q. Whom does that mean, Woodward, the inspector?—A. Yes, sir. the 27th of July and on the 3d of August, John Wood.
Q. Where do you find John Stone first?—A. I know there is only n Stone once or twice.
Q. John Stone, you say, represents Inspector Thomas?—A. Yes; n Stone on the 17th of August, 1888, and on the 24th of August, I l.
Q. If I understand you, wherever it appears in these time-books, n Stone represents Inspector Thomas?—A. Yes, sir.
Q. And John Luke or Lukes, wherever that appears, it represents spector Lucas?—A. Yes, sir.
Q. And John Night, wherever that appears in the books, it represents om?—A. Tom O'Brien.
Q. And John Wood represents Inspector Woodward?—A. Yes, sir.
Q. And John Smith, so far as you personally know, I think you have l, represents McNamara?—A. Yes, sir; McNamara.
Q. And you yourself do not know that John Smith represents any er inspector than McNamara?—A. No.
Q. But supposing that it appears there before McNamara was on the rk as an inspector, whom do you think it represented then?—A. I 't have any thoughts about it.
Q. You have no idea?—A. I have no knowledge.
Q. Have you ever heard anybody say?—A. No, sir.
Q. Are all the entries in those three time-books in your hand- ting?—A. No, sir.
Q. Part in Leroy's?—A. Part in Leroy's and part in mine and part the handwriting of Mr. Davis, though very little in Mr. Davis's hand- iting.

Q. Mr. Davis was the principal book-keeper, I believe?—A. yes, sir.

By Mr. DAWES:

Q. All of these Johns are entered in ink, except John Smith books, are they not?—A. I don't understand.

Q. All of these fictitious names, except John Smith, are enter on your books, are they not?—A. I believe so.

Q. All of the John Smiths are entered in pencil at the bot they not?—A. I know nothing about it.

Q. Can you find any entered in ink and not entered at the b the list? Look at the time-book.—A. (After making further Here is one on the 6th of July; John Smith is the second na the bottom; and again, John Smith is the third from the bott

Q. What is the other name below him?—A. John Walker, and John Sullivan, laborer.

Q. Are those real names?—A. Real names; yes, sir.

Q. Is the John Smith in ink in those places?—A. It is.

Q. In the same handwriting as the rest of the column?—A.

Q. In whose handwriting?—A. Mine.

Q. Is the John Smith in pencil in your handwriting, where it oc A. I don't see any John Smith in pencil; it is not in mine.

Q. Do you see John Smith in pencil on your time books at Not in the books what I see.

Q. Take the book during the summer of 1887.—A. It is from ary to October, 1887, the book is.

Q. Now take that, and answer from that book. Is "John Sm pencil in that book?—A. Yes, sir.

Q. Can you find it in ink on that book?—A. I find it here o

Q. More than once?—A. I haven't looked it all through yet.

Q. So far as you have looked through the book, with the e of that one, is it in pencil?—A. It is most all pencil.

Q. Do you find any instance, except the one you have spoken Not yet. (After further search.) I find another item here on of May, 1887, in ink. On the 13th of May it is also in ink. 18th of April, 1887, it is also in ink. On the 1st of April, 1887 11th of March, 1887; on the 25th of February, 1887. That is a book.

Q. Who kept that time-book?—A. I did.

Q. Are all the rest of those entries, except those you have me in pencil?—A. The handwriting in ink and pencil of "John S not my handwriting.

Q. The entry in pencil and ink?—A. The name of John Smi

Q. Neither in ink nor pencil?—A. Neither one is my writing

Q. Then the entry of "John Smith," whether in pencil or i the handwriting of some one else in that book?—A. Yes, sir.

Q. Whose handwriting is it?—A. It is partly Leroy's, and pa Davis's.

Q. In whose handwriting is the entry in ink?—A. Mostly in

Q. The pencil; is all that in one handwriting?—A. No, sir.

Q. Whose is that?—A. It is partly Mr. Leroy's and pa Davis's.

Q. Is the amount set against his name carried out in pencil w name is entered in pencil?—A. It is entered in pencil or carrie pencil all the time.

Q. It is entered in ink part of the time, the times you ha tioned?—A. Yes, sir; but the extension is made in pencil.

Is it included in the footings?—A. Yes, sir.
Will you turn to any one of them?—A. April 8.
That is the name entered in ink?—A. Yes, sir.
And the amount carried out in pencil?—A. Yes, sir.
And embraced in the footing?—A. It is.
Is the footing in pencil?—A. Yes, sir.
In whose handwriting is the footing?—A. It is Mr. Davis's.
Then the bottom of the page is in your handwriting?—A. Yes, sir.
All except the name John Smith.—A. Except the names John h and Sam. Kendall.
Is that name Kendall a real name?—A. Yes, sir, it is a real name; as a brick man. I very often started to copy off the names in my books on Wednesday and Tuesday, and would keep on so as to be e end of the week; Friday night, I would have to have it finished. 'riday noon I used to commence in the office to call my time off for ay for the full day; so whoever was in the office, Mr. Davis or Mr. y, would understand it, and we would call it off and have it finished evening.
Was this entry of "John Smith" at the foot there, by Mr. Davis, ncil, done in your presence?—A. I don't know.
Ever?—A. I don't recollect that.
Did you give over your book to him?—A. No, sir.
Did he have access to your book?—A. Yes, sir; he called the time

And you entered it. What do you mean by calling off the time?—'ery often I copied the names, and somebody else called out the

From the pass-books?—A. From the pass-books; yes.
Is that the way the book was made up by you and Mr. Davis?—t is; these pages.
How comes it that the body of the book is in your handwriting you come to John Smith, and then you changed work, and he s in this book and you call off? Is that the way it was done?—A. is a different item. I never made the footings. I called the time, any changes in rates or prices of laboring men or other men, I gave id it would be entered in the books. Generally somebody else did ooting and extending. We started about on Wednesday to start opying all the time.
In whose employ were you?—A. Mr. Quackenbush and Mr. Beck-

Who was responsible for the accuracy of that book?—A. I sup-I am.
How came you, then, to let somebody else take it and enter names ncil, and then foot up the amounts?—A. Mr. Leroy and Mr. Davis, are superiors to me; I am below them.
Nevertheless, if you were responsible for the books, how can you esponsible for a book which you surrendered to somebody else?—A. responsible for the time.
How can you be responsible for the time and then permit some-else to enter a name that you did not know whom it stood for?—don't say that I have ever been told that I was responsible for ooks, but I am responsible for the time what I took at the works.
How can you be responsible for the time without knowing whose e you enter on the books and what the time is?—A. Like Mr. Bren-and Mr. Palmer, and whoever else gives orders about certain time vertime, or any other allowance; it wasn't my business.

Q. Was it your business to write down on the books what o
ple told you?—A. If I had authority to do it or the people wa
sible to give me orders I did it.

Q. Then your book is not a transcript of the pass books?—A
knowledge it is.

Q. Is that part of it which embraces "John Smith" a transcri
time-books?—A. It is not. In the last work it is.

Q. With that book before you?—A. I don't know nothing

Q. Then you can not vouch for the accuracy of your own tim
can you?—A. I can not.

Q. Did you ever communicate to the men who employed you
time that you could not vouch for the accuracy of your own time-
A. No; I did not.

Q. Did you deliver over to your own employers a time-book
did not think was accurate?—A. I did not.

Q. You supposed this was accurate?—A. Yes, sir.

Q. Then you supposed that every name entered there was a
did you not?—A. Well, I don't know how to answer that, becaus
what my superiors do, after I am completing my work——

Q. You unterstand the question, do you not?—A. I do.

Q. What difficulty is there in answering the question whi
you: Whether you did not believe that the time-book you d
over represented the real transaction that it purported to repre
A. My time-book was a real transaction at the last work; all
overtime, or assumed names are copied from my little books.
fore that I couldn't say what other entries had been made af
livered the time.

Q. Then your time-book represented real transactions until y
to the fictitious names?—A. It does.

Q. And it went as your time-book, including the fictitious na
it not?—A. Yes, sir.

Q. Then you delivered over a time-book to your employers
knew did not represent real transactions, did you not?—A. I

Q. And you omitted to communicate to your employers that
that so?—A. I would——

Q. Is that so?—A. I don't know what to answer.

Q. Answer just as it is.—A. I understand that; I want to an
right way, but according to your question you want to know—

Q. I will repeat my question. Did you or did you not deli
to your employers a time-book which you knew did not repre
real transactions?—A. No, I did not.

Q. You knew it contained fictitious names?—A. Yes, sir.

Q. And you did not know whom the fictitious names represe
A. I don't say that I didn't know.

Q. Take that book there. You kept that book.—A. I did
but I don't know nothing about it.

Q. And there are fictitious names on that book. There
Smith on that book from beginning to end. Do you say y
whom John Smith represented on that book?—A. I do not.

Q. Then you delivered over that book as a record of real
tions when you knew it was not?—A. I don't say I did, sir.
real transaction, in my handwriting copied from my book, in rea
until somebody else made these entries after me.

Q. Taking that book with somebody else's entries of fictitiou
which you knew?—A. I did not.

Q. You knew they were fictitious names.—A. My business

d after I copied my time and called off my time. I wasn't respon-
e for anything after that.
. Did you know, when that name John Smith was entered in pen-
that it was a fictitious name?—A. No.
. You thought it was a real name?—A. I thought it was an order
n somebody.
. Did you think it was a real name?—A. I did not.
. You do not think it was a real name?—A. I don't think it was a
name, and I don't think it was a fictitious name, because it wasn't
business to.
. You didn't think it was a real name, and you did not think it was
ctitious name?—A. No, sir.
. What did you think it was?—A. I didn't think nothing about it.
. I want to get at that a little more clearly. You delivered over a
k in which you knew somebody entered, in pencil, "John Smith,"
t was not on the pass-books?—A. I did not. I have no reference to
work before this last.
. How came you to have somebody else take your book and write,
encil, John Smith's name after you had written everything else?—
The books laid in the office, not locked up or covered.
. If you took the names from the little pass-books, did you not take
here were on it?—A. Yes, sir.
. Then you knew John Smith's name was entered in pencil on your
ks, when it was not on the pass-books?—A. I did not.
. Did you not say that you took all the names yourself where it is
our handwriting, all the names that were on the pass-books?—A.
, sir.
. And then you say you did not know but what John Smith was on
pass-book?—A. It was not on the pass-book until the last transac-
.
. I am talking about this book before you, made in 1887; you knew
it was not on the pass-book, and you knew that it was put on your
k in pencil, and not by you, and footed up with your account, and
did not know whom it represented, and you delivered that book to
employers as a true record of the time, did you?—A. I did not
er the time.
. You kept it for them?—A. I kept it up to that time.
. As a true record of the time?—A. Yes, sir.
. And you knew it was not?—A. I kept my little books, and other
ons had access to this book.
. Is this your handwriting in this pass-book?—A. Yes, sir.
. What is that book?—A This is a heading book for drivings or
lings.
. A little pass-book?—A. No; this is the book we kept while going
g, and we checked in it. In the morning we made a little dot, and
ng the day we had to make a larger line for each day or fraction of
s during the time that the men were working.

By the CHAIRMAN:

. What is the book itself; is it not a time-book?—A. It is a time-
k we kept when going through the tunnel. That is the only book
kept.
. That is the original and first book?- -A. That is the original and
book.

By Mr. DAWES:

. That is John Smith, with the name and date?—A. Yes, sir.

Q. What is the date?—A. On the 5th of November, 1886.

Q. In your handwriting?—A. Yes, sir.

Q. Is that the first that it appears in this time-book?—A. It takes only a few weeks to fill a book, and it starts on the 22d of October, 1886.

Q. And ends when?—A. Two weeks afterwards.

Q. How much time does that include?—A. From the 22d of October till the 19th of November.

Q. How many times is John Smith on that book?

The CHAIRMAN. Mr. Bard, the clerk, can only find one.

A. That John Smith is a laborer.

Q. Is that a real laborer?—A. That is a real laborer.

Q. Does he appear anywhere else?—A. If his name is down; but I can't recollect from 1886.

Q. Did you know him?—A. I did.

Q. Then when he testified that the "John Smith" entered in your books in pencil is a fictitious John Smith, of course you knew it did not represent this man?—A. I didn't know, because——

Q. You knew it did not represent this man?—A. Yes, sir.

Q. When did you get that knowledge?—A. Just now, from you.

Q. Is that the first knowledge you had that there was a real John Smith during the time covered by this pass-book?—A. I didn't until——

Q. You knew it before?—A. I knew it probably in 1886.

Q. Now, my question is, when did you first know that the John Smith you have been entering on the time-table ceased to be a real man, and represented a fictitious one? When did that knowledge come to you?—A. It didn't come to me at all; I didn't think about it.

Q. You have testified, have you not, that you knew this John Smith entered in pencil was a fictitious man?—A. I told you before I didn't know nothing about it.

Q. I am not asking whom he represented. I ask you if you do not know that it covered a real name?—A. I told you it did not cover a real name.

Q. That was entered in pencil?—A. Yes, sir.

Q. Then it was a real John Smith, was it?—A. It did not cover the real John Smith.

Q. What do you mean? Do you mean to say it did not cover a real name; that it stood for somebody else?—A. Yes, sir.

Q. That is what you mean?—A. That is what I mean.

Q. Now, this "John Smith" did not stand for somebody else?—A. No; it is a real name.

Q. Now, my question is, when you knew the "John Smith" you were using ceased to be a real John Smith and stood for somebody else, when did that knowledge come to you?—A. As I said before, I knew that this John Smith was a real John Smith.

Q. And you know the other John Smith was somebody else?—A. I didn't know the other John Smith, but I know there was some transaction appeared some way, but through nobody, to my knowledge.

Q. You do not understand me. You know that the "John Smith" in pencil stood for somebody else?—A. Yes, sir.

Q. And that this John Smith did not stand for anybody but John Smith?—A. I expected it stands for other John Smiths, but it wasn't to my special knowledge; I hadn't been told, and didn't find out anything about it.

Q. You have not been told that it stood for somebody else, and you did not find out anything about it?—A. No.

How came you to think it did stand for somebody else?—A. I know.

Had you any more reason to think that John Smith stood for body else than that this John Smith stood for somebody else in books?—A. I know that this is a real pass-book.

Then why have you testified that that John Smith stood for body else and that this John Smith stood for a real man?—A. The the entry is made as to the character of the other names, as a la-, and according to the fraction of time, I know.

Then the peculiar manner in which the entry of John Smith is in pencil leads you to think it stood for somebody else?—A. That at I think.

And the John Smith in the pass-book which has been shown you tered in the ordinary way?—A. Yes, sir.

Now let us look into that. Then the name of John Smith in pencil entered in an unusual way, was it not?—A. Yes, sir.

What was there about that entry that was unusual?—A. I don't rstand; I don't understand your question.

You say that the reason you mistrusted that "John Smith" entered ncil stood for somebody else was the way in which it was entered; aid that in answer to my question?—A. Yes, sir.

You said in answer to my question that that was an unusual way; the next question is, what was there unusual about it?—A. Because rst I thought about it it had been a business transaction kept g people of higher—superior to me, not to let it be known to me, hey kept it from me among themselves.

Did you, or not, infer from the manner of its entry that it stood transaction not communicated to you?—A. Yes, sir.

And you entered it on the books of your employers with that im-ion, did you?—A. I did not.

You delivered over your own books, with that entry made by some-else, covering up a transaction of which you had no knowledge?—did not; I didn't deliver no books.

You kept the books of your employers as a record of real trans-ns, did you not?—A. Yes, sir; but——

And your record of real transactions had upon it what you believed e time represented at the time some concealed transaction?—A. sir.

And you kept this record for your employers as a true record, ing that fact, did you not?—A. To my knowledge.

You never communicated to your employers the fact that your record contained entries that covered up some other transaction?— was not my course to do it.

Answer that question.—A. I never did.

By the CHAIRMAN:

Look at this little original pass-book, and refer to the page which w open, and tell me, first, whether this is your handwriting?—A. It handwriting.

Give us the date.—A. May 6, 1887.

Is that May or March?—A. May.

And what heading is it?—A. Howard University heading.

Down towards the bottom there is a mark with a little bit of red l made by us, and there is what appears to be "Wood, Overs."—hat means Overton Wood.

That is a real person, is it?—A. On Saturday he worked on top.

"T" is for top; and the balance of the week he worked on th as a mucker.

Q. That means Overton Wood?—A. Yes, sir.

Q. And that is a real name?—A. That is a real name.

Q. Where does Overton Wood live?—A. He lives in Was and can be referred to any day.

Q. There is Thomas Wood on the same date?—A. That is name.

Q. That is another real man, is it?—A. That is another real

Q. And on Saturday, May 13, "Wood, Overs," in our red ma means the same real man?—A. Yes, sir; Overton Wood.

Q. Then it would be also on May 20, I suppose?—A. Yes, s

Q. Do you know how long that real John Smith staid on the A. No, sir.

Q. You have no recollection about it?—A. No; he was th near from the beginning to the end of the last work.

Q. All the way through on the last work?—A. Yes, sir; a months on the work the last time.

Q. Please turn to some of your entries there; say, take Ma you were working then; that was a date when this real Joh you have spoken of (entered in this first little pass-book) was John Smith?—A. Yes, sir.

Q. My question to you was, How long he staid on the w that time, from October, 1886?—A. I don't think you will fin more; only a week.

Q. Then he began again with the last work, did he?—A. Ye colored man on that book.

Q. He is a real man?—A. He is a real colored man.

Q. And he was there in October, 1886?—A. Yes, sir.

Q. How long did he stay that time?—A. About a week, I b

Q. And that ended him for that time?—A. That ended the r Smith.

Q. When did the real John Smith begin again?—A. Nowhe

Q. He was not on the work during the last time?—A. No, to my knowledge.

Q. You were around there keeping the time?—A. Yes, si couldn't recollect every name for the last three or four years.

Q. You do not find it there in May, for instance, the real Joh do you?—A. No, sir; this is tunnel work.

Q. So far as you know the real John Smith, the colored ma name appears in these little books, under date of October, 1886 continue any longer than appears in that little time-book?—A. you won't find the name in this book, either. He worked in nel; he didn't work at brick-work at all.

Q. It would not be there?—A. No, sir.

Q. Was he on the work at all?—A. I don't recollect that he

Q. You think, then, do you not, that wherever the name Smith appears in these books (the ones we have been calling tention to other than this one) it did not represent a real perso name?—A. I don't think it does.

By Mr. CLEMENTS:

Q. You say you were employed by Beckwith & Quackenbush keeper?—A. Yes, sir.

Q. Did you receive pay also from the subcontractors?—A.

Q. What did you receive from Beckwith & Quackenbush?— dollars a month.

Q. From what subcontractors did you receive pay also?—A. From rennan & Palmer and from Brennan & Emery.
Q. What did you receive from them?—A. Ten dollars a month.
Q. For how long?—A. The last time for three months, and before for out four or five months.
Q. That was in 1886, was it?—A. In 1886; yes, sir.
Q. And the others in 1887?—A. No; it was 1888.
Q. Now at the time the name of John Smith was entered in pencil ost frequently in the large book from which you have testified, were ou receiving a salary of $10 a month from the subcontractors also?—A. don't know. I would have to look at the book.
Q. You have the book before you.—A. (After searching book.) I find n the 5th of August one month, for the month of July, 1887, $10. hat is the first entry: "A. Heitmuller, week ending August 5, 1887."
Q. My question is at the time that Davis and Leroy entered in pencil that book the name of John Smith you were receiving from Beckwith Quackenbush a salary of $60 a month and from the subcontractors a lary of $10 a month?—A. Yes, from this time on.
Q. By whom were you employed first; Beckwith & Quackenbush?—. Yes, sir.
Q. Did you communicate to them the fact that you were receiving pay om the subcontractors?—A. Yes, sir.
Q. Did they approve of it?—A. Yes, sir.
Q. Was that in the original contract that you were to have $60 a onth from Beckwith & Quackenbush and $10 a month from the sub-ntractors?—A. No, sir.
Q. When did it become a part of the agreement?—A. In August, 887.
Q. You say that was known to Beckwith & Quackenbush?—A. Yes, r.
Q. Did you let them know it before you entered into the contract ith the subcontractors?—A. Yes, sir.
Q. And they approved of it?—A. Yes, sir.
Q. Did Davis or Leroy, or either of them, receive pay from the sub-ntractors?—A. Not to my knowledge. Can I explain the reason of is extra allowance?
Q. You can do so if you wish.—A. We had these books in the office. Ir. Emery at that time was subcontractor. Mr. Brennan came in he office very often and looked over the check-roll; so Mr. Emery oke to me, and said to me, "I want to know how much money is be-g spent and how much it is costing us every week, so I can make a lculation;" and he said, "I wish you would copy the check-roll every eek on a sheet of paper and deliver it to me, so I can any time in the vening or Sundays look over the account and see the expenses and he progress made, so I can make calculations for the following week." le said, "If there is any changes to be made in the men, or any re-uction or increase of force, I can't get any time to run over to the ffice, and so I will allow you $10 a month if you will do that and ake a regular weekly copy of the check-roll."
Q. In doing that what book did you take it from?—A. From this ook.
Q. Was that name of John Smith there in pencil at that time?—A. es, sir.
Q. Did you put it on the lists that you gave him?—A. Yes, sir.
Q. And still you did not believe that that represented a real man?
. I don't know.

Q. You say you do not think it does now?—A. I say it did n
Q. What did you think then about it when you copied
handed it over to the subcontractor?—A. I copied the name
livered the copy to him; I thought probably it was a transac
kept from my knowledge.
Q. You saw it was in pencil on the books, but in the hand
other persons, and all the balance of that book is in ink and
handwriting, is it not?—A. By not saying anything to me I
it was something I shouldn't know.
Q. But it was on your books that you were employed to k
you not think it was something you ought to understand?—
am younger than the others in my office.
Q. But still you say you were employed by the subcontracto
as contractors, and that Leroy and Davis, the men who pu
were employed by only Beckwith & Quackenbush. Did you
it was your duty to understand that entry put there in pencil
it was kept from me, and I made it my duty not to ask.
Q. But they put it on your book?—A. Yes, sir; I thought it
right by somebody who had authority, or that it wouldn't h
done.
Q. And you made it your business not to inquire?—A. Not t
Q. Do you have any idea or impression or belief as to who
son is?—A. I have not.
Q. You never have heard anybody say?—A. No, sir.

By the CHAIRMAN:

Q. Was there any real John Smith that you knew at work
time, in 1888?—A. I don't remember.
Q. Did you ever put down the name of an assumed John
your little books?—A. I did, when it was told me to do it.
Q. Where did you make up these little books in pencil, one
I hold in my hand, for 1888?—A. Underground.
Q. And you went under and took the names of the men?
put them down.
Q. I believe you have just said you have no recollection o
John Smith at this time?—A. I don't recollect; there migh
might not.
Q. Have you any recollection of any real John Smith?—
my certain knowledge; I couldn't say.
Q. Did you know any real man by the name of John Luk
Lukes?—A. No; I know a Jean Lucas.
Q. Who was he?—A. He was a little boy; Mr. Lucas put
get some money.
Q. You put his name down, did you not, as Jean Lucas?—
Q. Did you put down the assumed name of John Luke
Lukes, in 1888, anywhere in any of your little books that you
derground?—A. I believe I did.
Q. Under whose direction did you do that?—A. Mr. Palm
Q. Was he down underground too?—A. Yes, sir.
Q. On the spot?—A. I don't know that he was at the very
very near all the conversation was underground, and we n
ground, and any conversation we had on the subject was und
Q. Yes, I should think so. In your book, and in your ha
evidently, under date of June 22, 1888, I see "R. C. East,
suppose means Rock Creek east?—A. Yes, sir.

Now read the name close to the botton on the left hand page and me what it is.—A. It is John Smith.
Is that your writing?—A. Yes, sir.
Is there a little cross-mark against it?—A. Yes, sir.
Is that your cross-mark?—A. Yes, sir.
How did you come to put that name down?—A. I had been told ut it down by orders.
What were the orders?—A. Mr. Palmer gave the order for over .
Whose over time?—A. John Smith's.
Did you then know any such man?—A. No; it is a fictitious e for McNamara.
So that you put down the name of John Smith, while you were erground, in connection with the others, as a false name to repre- the inspector, McNamara?—A. Yes, sir.
Why did you put a cross-check against it?—A. As a memoran- ; that was, a memorandum for a certain thing.
Tell us what the certain thing was.—A. That it was for somebody
That is, that it was a false name?—A. That it was a false name.
Are you sure that McNamara was at that time inspecting at that spot?—A. Yes, sir.
Was it during all that summer, then, that you understood John th represented McNamara?—A. I did.
And it was earlier than that when you have told us that the e of John Smith represented somebody whose identity you do not w?—A. Yes, sir.
It was before that?—A. Yes, sir.
Did you understand that John Smith, during all this summer of , represented McNamara and nobody else?—A. I understood so.
Did you ever figure up to see how much John Smith had got, the l amount?—A. I have not.
Do you not know that it amounts to several hundred dollars?— don't know.
You could tell from your books, could you not?—A. I could, but ver figured any on it.
You did not notice that that John Smith all the way through was ing a very large sum of money as compared with the other false ws, Lucas, O'Brien, and so on?—A. I never paid much attention , because it wasn't my business, and I didn't make it my business.
Can you tell us how it happened that you entered in your little ks there the false name of John Smith, and why you did not trans- t always to the big book, and how it happened that in the big book it ld be entered sometimes for the first time, not appearing in your e book?—A. Probably by orders at the office, because I only would r when I had orders to do it.
You had a standing order, had you not, as to all these false names? y did not tell you every time, did they?—A. Yes, sir.
Every single time?—A. They told me every time there was over- .
That is, they told you, whenever there was overtime, to put down e false names for these various men?—A. Yes, sir.
Then you went along obeying that general order?—A. Yes, sir.
And every time you found that any of these inspectors were work- more than the nine hours, you then put down a false name?—A. sir.

Q. What did you do?—A. I only done it when I had an ord
it, or Mr. Palmer generally told me. I met him here or there,
told me that this or that man "worked overtime last night or t
before, and you will have to allow him time for it." He said
orders from nobody else than him.

Q. You mean to say that every time you made one of these
tries, Palmer had specially directed you to do it on that occasi
Yes, sir; he had.

Q. And that you had not any standing order?—A. No, sir.
twice I didn't have any conversation with him, and I forgot it;
told me afterwards what is the reason I had forgotten it, and
didn't know, and I said I didn't enter it because he hadn't
That shows that I had no standing order, but had a special ord
week.

Q. When he reminded you of it in this way, who were the p
spoke of?—A. These men who were inspectors.

Q. Do you remember who they were?—A. McNamara a
O'Brien.

Q. Is that all?—A. They are the most; they received th
After that there was Mr. Thomas, Mr. Lucas, and Mr. Woodwa

Q. Anybody else?—A. No, sir.

Q. Did any of the other inspectors work overtime?—A.
know.

Q. You do not know?—A. No.

Q. Did it ever occur to you to think how it happened that o
was being paid to these four persons and not to the other inspe
A. No, sir; because I know there was no overtime made i
places. At that time I don't think it was usual, I am not sure; b
if it was, there might be one or two inspectors working a half
so without complaining or mentioning it.

Q. Did you ever have any conversation with any of these
spectors you have named about their overtime?—A. I had la
mer.

Q. Who were they that you were talking with about it?—
that Woodward told me he worked two or three hours, and fiv
once, and he told me about it, and while I passed along he sai
all worked last night, and so did I;" but I didn't take no noti
and didn't give him no answer.

Q. Did he get pay for that time?—A. I believe he did. It m
that he told somebody else about it.

Q. Who made out and directed the envelopes that contai
money that was to be handed around?—A. I did.

Q. What did you do with them?—A. Put each gang separate
rubber band around it, and put it aside for Saturday morning.

Q. And then when Saturday morning came what did you d
Mr. Leroy got a check from Mr. Davis, and went to the bank
Davis generally went to the bank himself, and got some mon
the money was put up in the office by Mr. Leroy and Mr. Da
sometimes one or two of the engineers used to be generally
around waiting for their money, and they would help a little.

Q. They put the money into those envelopes?—A. Yes, sir.

Q. Then who took the envelopes when the money was once
and they were all addressed?—A. Mr. Leroy.

Q. You did not carry them around?—A. Oh, yes; I did, som

Q. When you carried them around how did you deliver them
delivered them to every man what the name called for.

Q. When you found John Night to whom did you deliver that?—A. gave it to Mr. Palmer.

Q. When you found John Luke to whom did you give it?—A. To Ir. Palmer.

Q. And John Night?—A. I never found any John Night, because it ras very little I had to do with it. I generally took Foundry Branch nd Rock Creek and where there wasn't any overtime.

Q. Do you mean to say that all the envelopes containing the false ddresses you always gave to Palmer and never delivered them to the ien yourself?—A. I do.

Q. So that in no instance did you ever deliver any of these envelopes ith the false names on them?—A. Not to my recollection.

Q. How did it happen that Palmer came to take those particular en-elopes away from you and not let you deliver them?—A. I don't know.

Q. Did you ever have any conversation with him about it?—A. No; ecause Mr. Palmer generally asked me which way I would go.

Q. Did you deliver all the John Smith envelopes to Palmer too?—A. es, sir. I didn't deliver any; I hardly ever paid many envelopes. I ostly went to Foundry Branch.

Q. Take McNamara, whom you say John Smith represented during hat period of time. Did you never deliver any envelopes to him?—A. ot to my recollection.

Q. But your recollection is, of this fictitious business, that after the mounts of money were make up and you addressed the envelopes nd the money was put in, Palmer took these false ones and you took he real ones; is that what you mean?—A. No, I don't say so.

Q. What do you say then?—A. It is divided up into gangs, shafts, nd sections. At Foundry Branch it might take probably 100 or 120 nvelopes, and I would go along and we settled them, because there ere hardly any other names than those real names.

Q. That does not answer the question.—A. I never had any John mith envelopes. That is your question.

Q. You never addressed any?—A. Oh, yes; I did.

Q. Who had them?—A. They were all in a package.

Q. Who had the package?—A. Mr. Leroy.

Q. But you have told me that you took the packages after the money as all in, and that you went into the tunnel and paid the men?—A. I old you, sir, that I paid part of the money, the smallest part of it, at ome times in some parts of the tunnel; but Mr. Leroy was the general an who did that and sometimes he had too much and couldn't get all ver the ground and then he would leave one or two packages for me o deliver at the farther end, either east or west.

Q. Whoever took the package, then, for the real men at some shafts here you were not to go, also took the package with the false names n it, did he?—A. It was all mixed; there was no special package bout it.

Q. Was there not a separate envelope with the false name on it?—A. Oh, yes.

Q. And that would be tied up with the other envelopes?—A. Yes, ir.

Q. Was that true in regard to the places where you paid?—A. I don't ecollect; it was paid on a different place; I don't know actually which laces I paid.

Q. Then you might happen to have in your bundle at a particular haft one of these falsely addressed envelopes, might you not?—A. I ight; yes.

Q. If you had what did you do with it?—A. I probably gave Palmer, too.

Q. Even when you were to pay the rest of the men?—A.—

Q. Do you remember that?—A. To the best of my knowled

Q. So that, to your best knowledge, you never delivered an falsely addressed envelopes to anybody but Palmer?—A. Yes

By Mr. McMILLIN:

Q. How did you come to deliver them to Palmer in the stance?—A. Because he was the man that gave me the order t time down.

Q. But you did not give the others, and he ordered you to in. Why did you deliver to him one of the fraudulent ones? cause he told me to.

Q. So he told you to make them up, and told you to deliver A. He didn't say nothing special about making them up, bu me to give them to him, and he would deliver them.

Q. But he had told you to make the entries in the books?- sir.

Q. During the months of May, June, and July, I see that the constantly, every week, to those fictitious names, such as Jol in more of the entries than one; for instance, May 27, paid Rock Creek, $8; at Champlain avenue, $24, and in Howard U $8.—A. 1887?

Q. That was in 1887.—A. I don't know anything about tha

Q. Were you not there then?—A. Yes, sir.

Q. Did you not keep the time then?—A. Yes, sir.

Q. Do you not know as much about that time as you do a other?—A. No, sir.

Q. Why not?—A. As I explained to these other gentleme my time, and there is this entry in a different handwriting.

Q. Turn to the time-book and see what the entries are on 1887. See if you did not on that day pay to John Smith Creek east, $8; at Champlain avenue, $24; and Howard U $8?—A. Yes, I did.

Q. In whose handwriting?—A. Mr. Leroy's.

Q. Who kept the time at that place?—A. I did.

Q. Did you make any entries in your books?—A. The rea in my handwriting, except this John Smith is in a different ing; that was done after I entered mine.

Q. Then you can not account for the reason why there is every week during those three months I have mentioned, on C avenue, $24 to John Smith?—A. I can not.

Q. And you do not know why it was that there was paid this fraudulent person in Howard University?—A. I can't acco

Q. And neither Mr. Leroy nor Mr. Palmer ever explained it A. No, they didn't.

Q. I see that the same continues; that on June 3 there wa John Smith, Champlain avenue, $25; June 10, $25; June 17, $ 24, $25; July 1, $25; July 8, $25; July 15, $25; and every t is paid to him $25 it is on that particular shaft, but on the oth only $8; you can not explain that?—A. No, sir; I can not.

TESTIMONY OF ANDREW J. SPARROW.

TUESDAY, *January* 15, 1889.

ANDREW J. SPARROW, sworn and examined.

By the CHAIRMAN:

Q. What is your age?—A. Fifty-five years.

Q. What is your occupation?—A. Inspector of masonry.

Q. Where do you reside?—A. I reside in Potsdam, N. Y.; that is my home.

Q. How long have you followed the occupation of inspector of masonry?—A. About two years.

Q. What was your occupation before?—A. Before then I had been, in my early days, a builder, and after that I was in the manufacturing business.

Q. You have now recently been engaged in inspecting the line of the Aqueduct tunnel here, I believe?—A. Yes, sir.

Q. Where were you engaged next previously, as an inspector, to your coming here?—A. On the Croton aqueduct, New York.

Q. On the new Croton aqueduct?—A. Yes, sir.

Q. Is it a lined aqueduct?—A. Yes, sir.

Q. And intended to carry water under pressure?—A. Under pressure only part of the distance.

Q. About how much of the distance is intended to be under pressure?—A. I couldn't answer that very correctly, but my impression is that it is about from 12 to 15 miles that it would be under more or less pressure.

Q. What is the whole length of that tunnel?—A. About 33 miles, I think.

Q. Is that lined all the way?—A. It is, and is to be.

Q. What kind of lining?—A. Brick.

Q. When did you come here, and under whose authority, to inspect the work in this tunnel?—A. I came here on the 7th day of November, by the authority of Maj. G. J. Lydecker.

Q. Tell us how far you have progressed with that work in inspecting this tunnel, what you did, and what you found, in brief.—A. I have caused it to be sounded, and listened to the soundings, for the entire length of the lining that is now in.

Q. Will you not describe briefly the method of this sounding, and how it is done, and so on?—A. It is done by a steel rod striking the lining, and then listening to the sound, and by that means telling what the character of the work back of the lining is pretty nearly in the clearance, or the distance between the lining and the stone; also cavities, if they exist; and where there is rubble work back of the lining, it will indicate if the rubble work back of the lining is laid solidly; and if there should be loose joints in the bricks, either collar or bed joints, the rod will show it; but for these cross joints, it is not certain to denote that they are hollow.

Q. What is the size and weight of this steel bar?—A. They have three sizes; one is five-eighths of an inch, one three-fourths, and the other seven-eighths.

Q. How long?—A. We are using rods here about 6½ feet long.

Q. Have they a head?—A. They have a sort of bell-shaped head, an upset head.

Q. Is the lining of this tunnel similar to the lining of the New York tunnel that you spoke of?—A. Yes, sir.

Q. In the general plan?—A. Yes, sir; the general plan is th
Q. The size of the New York tunnel, I believe, is greater
think it has twice the capacity of this.
Q. Had you made similar experiments or done similar work
tunnel, sounding to ascertain its nature?—A. I had on certai
sions.
Q. About how long a period had you been doing that by so
before you came here?—A. About seven months, I think.
Q. While you were doing that work at New York during thos
months, did you take any steps, and if so, what, by actual open
ascertain the accuracy of this oscultation, as I will call it,
cussion?—A. After having sounded we opened several places
vision, as denoted there between 13 and 15, that is, two miles, a
not remember now just the number of openings I caused to b
but quite a number. We found there that the rod told a very
story, and could be read very correctly. Mistakes will occu
work we found to be generally very loose, free from cement, and
tinuous; it is very difficult, indeed, to locate where there is consi
of a cavity, because you will hear that cavity, feel it, read it son
before you reach it, and it is almost impossible to tell when y
reached it until you come to it; then it speaks for itself, of cour
it is very misleading.
Q. How far have you now proceeded with the sounding of th
of this tunnel?—A. I have sounded from Howard to the wes
the entire length of the lining that is now laid.
Q. Have you examined any openings, according to the indica
the soundings there?—A. Yes, sir.
Q. About how many?—A. I have made and examined one h
and eighty-eight openings. I have now caused to be cut, which
not examined, I think about that number, or a little more.
Q. That you have yet to examine?—A. Yet to examine.
Q. Take the one hundred and eighty-eight that I understand
say you have cut in accordance with the indications of the
and have examined; how do they correspond to what the
indicated?—A. With three exceptions they were as bad as
than what they indicated. My plan is to not note it as bad a
pears to me; but in three instances it was better than I exp
just the openings. I would say, however, that I caused some
openings to be made, not for the purpose of showing how bad th
is, but to give the expert engineers an opportunity to see what
by certain markings and the remarks I made in relation to it.
Q. In other words, as the musicians would say, to get the r
your scale?—A. Yes, sir.
Q. I suppose those one hundred and eighty-eight openings y
made are distributed along through the tunnel regularly?—A
Howard to the east boundary of Rock Creek east.
Q. Now tell us what you found on making those one hund
eighty-eight openings?
The WITNESS. Summing it all up, you do not wish me to go
tails?
The CHAIRMAN. Yes.
A. I found a very loose, dry, hollow condition from one end
other. There are places packed in fairly well, and in some plac
was quite considerable packing above the arch; other places, a
I could see and have examined, or as far as examination is nee
packing is entirely absent. The side walls, as we call them, of

nel as a rule, are far better than the arch. In fact, they are not fairly well laid, but they are fairly well laid in comparison.

Q. With the top?—A. With the top; but the whole, as a whole, is one loose, faulty piece of work; and, as I said before, over the arch (taking it from the springing line to the crown of the arch) it is fearfully vacant. I brought my record with me in case you should wish to refer to any particular place.

Q. In this space that you have mentioned, containing these one hundred and eighty-eight cuttings you have made, did you find any vacant places that were remarkable in respect of extent and size?—A. To me; yes, sir.

Q. Name two or three of the places there, within your recollection, of the largest holes you found unfilled?—A. One of the largest extends in Champlain avenue from about station 900, or 900 feet from the shaft, to 1020 I will say, though I think it extends beyond that; and then there is what is known as the Crow's Nest, a very dangerous place, and I have not given that as thorough examination as I should, but I have examined it partially, and I find there a very vacant, unsatisfactory condition, and unsupported; and the arch, in my judgment, has not sufficient strength to sustain the weight that I suppose to be over it from the representations of those who are acquainted with it.

Q. The weight of the loose rocks above?—A. The weight of the loose rocks above and the way the roof is supported; it is supported on what we call legs, and those legs standing on this arch, the weight is not distributed, so you do not get the strength of the arch; and again, the brick-work in many places was not sustained at all itself; it is not well laid. Consequently, it makes the whole spot at that place very, very dangerous, I think, unsupported. Then there is another——

Q. Before you go to the next one, take the first one you name, and state where it was; and unless I misunderstood you, you did not find what kind of a vacancy it was in the great spot you mentioned from 900 to 1020.—A. I found it very hollow, and there are false walls built over the arch on an average about 12 feet apart. These cross walls are built to face the way in which the work was laid; supposing they were at work from the east towards the west, on the west wall they would cement the bottom of this wall over the arch and throw in quite a quantity of stone until they got a space that was wide enough to sustain itself, and then fill up with stone until it came to the roof of the rock; then the base of this wall would be pointed, and when it was completed, the wall would be pretty nearly perpendicular and pointed up, showing upon its face that it was nice rubble walls. Those walls I caused to be removed in a measure, so that I could pass through them, and I can now pass from station 925 to 1020 over the arch, and in some places it is 9½ and in other places 10½ feet high.

Q. So that you can stand erect and walk along?—A. Oh, yes, sir.

Q. State right there how many feet that distance would be from 9+25 to 1020.—A. Ninety-five feet. I have the exact dimensions with me.

Q. Give the exact dimensions.—A. If you will allow me I will read this description of 975 as I describe it in my record and you can take as much of it as you please in evidence.

Q. Begin your description of 975 by stating from which shaft and which way.—A. It is going west from Champlain avenue shaft.

Q. Now read the description.—A. (Reading:)

Cut south 2 feet long, eight courses wide, found dry filling with some cement, four rings, brick well laid; upon removing filling found opening toward west extending

upwards into a large cavity which was apparently confined within solid east and west, while low down on haunches stones are thrown in loose breaking through these walls we opened into another east and so continu was reached, or 50 feet. Then west till 1015 was reached or 40 feet. Making uous cavity 90 feet, broken only by cross walls about every 12 feet. This c measured in eight different sections and averaged as follows: 90 feet lo wide, 5 feet 6 inches clearance, evidently extending east and west fro tion named above. This was a timbered section and the cross walls spok laid up under the caps and over where necessary to close the whole from vi

Later this cavity spoken of above was examined by Mr. Thomas B. Main it extended west beyond cross walls to 1019, making the entire length of feet instead of 90 feet, as above recorded.

Q. You say that cavity was timbered?—A. Sections of it, y

Q. But that is not the Crow's Nest place?—A. No, sir; it is

Q. To what extent were portions timbered?—A. I couldn't that, because I did not charge my memory with it, and I took especially.

Q. You may give us one or two more instances of other ca A. I have one in my mind of 188 feet, but I don't just call to n where I commenced it. Several holes were distributed along ent places. I will try to turn to the place in my record, how have a record here of quite a number, such as 46 feet, 33 feet and 32 feet long. Here is also one of 56 feet long, which is particularly different from any others that are of smaller dim but I have said considerable about it, and I will give it to you it in my notes:

Cut key 2 feet long, found cavity 56 feet long, 9 feet wide, 3 feet 6 in West wall under cap; east, low rock and wall; over south haunches lo dry; north, low rock and partly-built rubble wall, sounding dry and hollo haunch; three dummy walls east of hole; dry stone scattered over arch; haunches, stone thrown in loosely, also over crown of arch. Above timbe timber and stone intended as a support, but poorly constructed. Rock o this cavity loose. Beyond cap and wall, west stand in chamber bounde timber pier built like a sole-house; east, by a dummy wall; north and solid rock; below, by loose stone thrown over arch with rock 6 feet abov pier another cavity not explored.

Since this description was taken a piece of rock about 3 feet cube has sli roof and rests on one edge on top of lining, and is liable to fall at any mom held in position only by a stick of timber, thus being dangerous to measur

Q. When you speak of the average height you mean the heig the crown of the arch?—A. Yes, sir; it is 56 feet long. Thes conventional cross walls dropping in and extending over the a

By Mr. DAWES:

Q. About 12 feet?—A. About that; in some places they a than that. I went in there to measure and found this roc thought I had better listen to it. I found certain places, for w poses I don't know, where the rock was scattered over the cro arch, and in those places it is 3 feet deep, and above that it w to the roof of the rocks. There are a great number of cavities feet down to 10 and 12 feet that I can give you almost any nu but I do not know that you will care to take them.

By the CHAIRMAN:

Q. Not now; but after you have made the inspection of the tings you have made we shall want to call you again, and perha think fit to take the whole of that description, if you shall hav it all out by that time. Are these numerous places which you scribed, which you have already inspected, distributed all a work?—A. Yes, sir; they are distributed all along the work.

Q. How long a space of that lining that you have now soun

cut into, and inspected, is there in any one continuous piece that is soundly and solidly packed on the outside of the arch?—A. I have written my judgment on what I have found, which shows that not one foot from Howard University to the west shaft have I found to be continuous good work, extending from invert to invert.

Q. There is something the matter everywhere?—A. Everywhere. I would like to qualify that in this way: There are places where I have been told that they intended to have it dry packed, where it sounds dry and is dry work; but so far as being solid is concerned, or being laid as I should say well, I do not consider it so, and I would like to have that exempt from this statement of good work; that I do not call good work at all. But where there is any cement to be used and was intended, as I understand it, to be solid work, so far as that is concerned, I have not found a place the width of my bar, from Howard University to the west shaft; I have found portions extending up from the invert on the side walls to the springing lines, and partially, perhaps, away up in some instances on the arch from the springing line, and dropping and catching it again on the other side.

Another thing I wish to state: My soundings are made every 5 feet; between those stations of 5 feet there may be a spot that I have not struck.

Q. If so, it might be good or it might be bad?—A. It might be good or it might be bad, but I should feel quite confident that I could make a statement that you would fail to find any good there.

Q. Do I understand you to mean to say that, from your inspection which you have described, there is really no continuous section of this professedly completed work as a whole that is good all the way around?—A. I have not found it.

By Mr. McMILLIN:

Q. What, in your opinion, was the object and purpose of these cross walls and cavities?—A. Coming down to opinion, there is only one object in it; that is, to deceive. I have heard things said to me since I have been here that caused me to turn back and order cuttings in order to prove to my own satisfaction that my rod was telling the truth and that I had been untrue to the rod, because I had passed by certain sections. I have a record of a place where I turned back, that has not been spoken of.

By the CHAIRMAN:

Q. How did you come to turn back to it?—A. My soundings were recorded as saying that it was dry and hollow. The representation had been given to me by parties on the work that it was packed solidly, and that they knew it, because they had given it personal supervision.

Q. Who were those parties?—A. The supervising inspector, Mr. Kirlin. I thought there must be some mistake, that he had been deceived. So I thought I would turn back and cut those openings to satisfy myself and also the committee of expert engineers. So I ordered them to be cut, and I have a record of what was proved upon my investigation with my soundings.

Q. Just tell us what that was in that connection.—A. The simplest way is to repeat it to you.

Q. Describe the place.—A. It is called the Crow's Nest in West Champlain.

Conditions having been found so much different than were supposed from reports given me at other points on this work, felt that possibly there might be some mistake in conditions existing at this particular place, and so ordered it opened at three stations, with the following results:

Cut key 2 feet long; found cavity 8 feet 6 inches long, 5 feet wide, 2 fe
west dry wall sounding hollow beyond; east dry stone and low rock; nort
east half stone low down; west half dry stone to near jaw of key; south ha
stone and low rock surrounding hollow below; rock seamy; east three ri
ring dry; west four rings fourth ring partly laid.

Cut key 2 feet long; found cavity 7 feet 6 inches long, 11 feet wide, 2 feet
high. West dry wall under timber cap surrounding hollow beyond east dr
cap. Over haunches stone thrown in dry and loose, sounding dry and hollo
A mass of timber overhead were three rings, east four rings brick wall laid.

Cut key 2 feet long; found cavity 18 feet 6 inches long, 12 feet wide, 5 feet hig
brick wall under cap surrounding hollow beyond, lagging over cap. East
and low rock between hole cut and east end. Dry wall under cap, with
resting on cap but one stick of timber. Stone scattered over key and haunch
ing dry below. Rock seamy and poorly protected; three rings brick solid.

This is the famous Crow's Nest that was said to be well protected and pac
under special supervision.

This cap was supported by battery posts, as they are called.

Q. What do you mean by cap?—A. The cap is the suppo
goes across the top and rests upon these posts, and upon whic
is lagging, and is substantially a part of the lagging. Ther
stick of timber laid over this cap longitudinally, and I did not s
its use was.

Q. Who do you say it was told you that the work in those pla
have last described had been thoroughly done to his own knowl
A. Mr. Kirlin. His remark was this: "This here is solid;
that to be so, because I gave it my personal supervision." In
make that full I should say what drew that remark out. I ha
cut further east, and the man that was cutting it came upon lo
and dare not remove it. The hole seemed to be solid, that is, v
packing from there to the roof.

I went in with the engineers, and Mr. Kirlin also was with
they called my attention to this hole, and said I, "Pull the sto
He said, "It won't do, because this is a very dangerous place her
don't know what the result will be." Said I, "No matter if it
ning water up there, pull it out." He said, "There is no object
that out, because I know it to be solidly packed—because I ga
personal attention." That is what first drew that out. After
two occasions, he used this same expression, and that expressio
me to have the impression that perhaps I was being led astray,
my rod had told me that there were cavities there; though I ex
it on the ground that there was a great mass of timber and co
piled up from 30 to 50 feet high, and that that was what the
telling me, and so I passed by; and then the impression that I
ing led astray came upon me, and so I thought it best to know
the rod was wrong, or whether I was wrong, and I found that
was right, and I had been false.

By Mr. FAULKNER:

Q. After you ascertained that these cavities were there, did
you any explanation of his remarks?—A. No, sir. I have had
with him.

Q. He was not present and did not see the cavities?—A.
Before I ever saw them the engineers saw them. I open the ho
if they care to do so they make the examination. But I perso
not care anything about the holes; I don't care what they show
satisfied in my own mind, and I am confident they will show as
or worse than I indicate; so that I do not desire to have any in
until I look at them to describe them. Mr. Kirlin was with us
day, but I did not feel inclined to put this upon record as t
thought he meant to decieve me. I have other explanations of

TESTIMONY OF ANDREW J. SPARROW—Recalled.

TUESDAY, *January* 29, 1889.

ANDREW J. SPARROW was recalled and further examined, as follows:

By the CHAIRMAN:

Q. When you were examined on the 15th you stated that you had not then completed your inspection of the whole length of the lining of the tunnel, but had inspected and stated to us what you had discovered in that part of it which down to that time you had finally examined, I believe, did you not?—A. Yes, sir.

Q. Will you now proceed and tell us whether you have since completed your inspection of the rest of the lining that you did not speak of in detail before?—A. I have inspected through the west shaft to the distributing reservoir, and have completed my investigation as far as I was directed.

Q. Where did your last evidence leave off in regard to the point in the tunnel, going west?—A. At west shaft.

Q. I mean how far west did you describe in your last examination?

The WITNESS. Here?

The CHAIRMAN. Yes.

A. Well, I haven't it in mind, but if I remember correctly, it was at the close of Champlain west. I am quite confident it was.

Q. Beginning where your particular descriptions left off on the former occasion, at the end of Champlain avenue west shaft, and the beginning of Rock Creek east, tell us what you have discovered between that point and the present distributing reservoir.

The WITNESS. In detail?

The CHAIRMAN. First you may state in general and then you may mention any particular details that are interesting.

A. I have found about the same character of work, excepting in the brick-work. The brick-work is of poorer quality, more especially in Rock Creek west and Foundry Branch east and west. I think as a whole it is the poorest work in the tunnel, both from the soundings and where it has been my privilege to examine.

Q. About how many openings are made from the point where your testimony left off before, going west to the end of the tunnel?—A. I have made about two hundred more openings.

Q. Have you inspected at each one of those openings yourself?—A. Every one of them; yes, sir.

Q. And I understand you to say that you found the brick-work, through which you made these openings, worse than that which you described on the former occasion in your testimony?—A. Generally, yes.

Q. What was the trouble with it?—A. The joints were not well filled, especially the second and third rings, especially where they were exposed on the outer side of the arch; and the indications were that the middle rings, where there were three rings, were not as well laid, which was largely estimated from the condition in which we found the third ring; and also the leaving out of many courses of brick; and many courses that were laid were laid butted together, without any attention whatever being paid to the bond, and no attention being paid to their being laid radially; they were laid horizontally and on the collar joints and most

any way to fill space and pass; any way to get by such points tunnel, doing it roughly and carelessly.

Q. These defects you now speak of you discovered in these tw dred or so holes that you made through?—A. More are there tha ther east.

Q. What was the quality of the brick itself?—A. I never gav particular attention. Still, in several instances I did, and I thou a whole the brick would average well; it seemed to be hard an compounded and well burned, except in one or two places alon last work that was done, where I judged, by the condition of called mortar or cement, that they were very soft; they appeare me. I have some evidence here that I have given before the m court of inquiry in relation to a certain portion of the recent and also of that so-called cement used. It is brief, but I carried of the mortar or of the cement to that court for that examinatio

Q. You can state all that you stated to them, as a short way ting at that.—A. I found at a certain place—I do not recall t just the station in the tunnel now, but it is in Foundry Branch where the brick-work sounded very bad, and also the filling; packed pretty well and filled pretty well, yet it had that spong sound. At the close of a section of brick-work, where they finishe work for the year, I had the man take the rod and remove some brick or some of the rubble work or filling, and in doing so ther quite heavy pieces of so-called cement fell. I picked up one of pieces just as it fell from above, and took it to the court of inquir I could discover but very little cement in it. It appeared like mud from a river bottom, or from where the water had stood, with so tle cement mixed with it; but there was no consistency, no adh ness, and it would form no bond; it wouldn't harden; would no

Q. Something like a cold corn cake, I should infer from your d tion.—A. A good deal like a cold corn cake, perhaps with more tency, though not more than of some I have seen that were pret cooked. Its lack of consistency and adhesiveness was such th answer to a question, I should recommend and should insist, if my individual work, upon its being removed. I think I will m two places of that character, not to exceed 200 feet in length eith of them.

Q. What do you mean by "not to exceed?"—A. In length fro point where they stopped the brick-work at the end of the season fore this investigation; near the old work; not to go back fro old work over 200 feet.

Q. Not over 200 feet, do you say?—A. Not over 200 feet in a

Q. How much less than 200 feet?—A. I couldn't say. That have to be determined upon their removal. I know this exceed feet before I came along. It might be, upon investigation, that it go farther, or not go quite so far.

Q. That relates, if I understand you, to the character of the masonry?—A. The material; yes, sir, and also to what was sup to be cement that was to sustain the rubble.

Q. In the course of about 200 feet did you make any openi all?—A. I think I did; yes, sir.

Q. How did you find the lining?—A. We found the lining well laid with this kind of material; it was soft.

Q. But the space was filled up?—A. The space was well fille solidly, but very well done, showing more care than usual upo work.

Q. How many considerable caverns did you find in the course of ese two hundred openings of which we are now speaking?—A. In swering that I would be obliged to answer comparatively, because in at kind of work, for the purpose for which it was intended and the ength required, anything of a cavity is a large cavity.

Q. That is true, and I should have put my question more specifically. those two hundred openings that you made in the sections that we now speaking of how many places did you find that had any vacant ace above the lining?—A. Every hole.

Q. Your soundings, then, proved to be an accurate indication of ere being a vacancy behind?—A. To me it did. I would say, how- er, that many openings that I caused to be made—not because I felt necessary to open them to repair—but to prove that where it was ex- cted to be solid and was supposed to be by the men in charge, yet rod said there were small cavities there, like rubble carelessly own in—stone and a pretty good quantity of cement—and at the same e leaving these avenues through the stone. I have made mention in report of several such places and there are many that I did not ke mention of. But, as a rule, my object was to open into greater less cavities, and also that, in case of repairing the work, these holes at were cut through the lining might be of use and advantage in re- ring.

Q. I understand you to say that in the whole of the two hundred that did open upon the indications given by the sounding instruments found that the sounding instrument had truly indicated that there re some greater or less cavities at every place?—A. Yes, sir; there s no instance that I know of now but three. There are three instances ere the work was better than I had anticipated from the sounding of rod out of the three hundred and eighty-nine holes.

Q. In any one of those three instances was the work perfect and id?—A. No, sir; but I did expect to find more of a cavity than I did d and looser work.

Q In these two hundred cuttings did you find any places where there re large cavities?—A. Yes, sir; quite large.

Q. Describe some two or three of the largest of them.—A. By your uest I estimated specially two or three places that you might get an a, and I will refer to those. I will first call your attention to a cut de at a place, under orders, at station 13+20, Champlain west. It s cut and examined as such, and had the appearance of things above remaining as it was, and is reported in my report thus:

3+20. Cut key 2 feet long. West dry wall hollow beyond. East dry wall, low k, hollow beyond. Over haunches, dry wall, little cement; sound, dry below; k solid; three rings, solid.

Since then I have caused that part of the rubble that appeared in e cutting to be removed, as my sounding said it was dry and hollow ove, and this is what I found:

Upon removing walls and stones from and around cutting, as described on page 8 report, found cavity 29 feet long, 5 feet wide, 2 feet 6 inches high above stones at were thrown in over crown of arch.

There was a body of stone, varying from 2 to 3½ feet in depth, thrown ght over the crown of the arch. The walls of the tunnel were ex- vated quite perpendicularly, and the roof was quite flat, and this one was thrown over pretty nearly level across the haunches of the ch, and above this was this open cavity. There was no strength to e stones that were put in there at all, and this cavity might just as ell have extended to the roof of the tunnel.

Then, again, at station 14+00 there was a place there that had n
examined thoroughly, and I desired to know more about it. So I
back to it. The hole had been ordered and cut and described
wanted the material removed. So I had it removed, and this
result:

Upon returning to examine this cutting 14+00, found that it had been inc
my description of 13+70, but estimate and now describe this particular spot
tion as it was before removing the walls east and west and included in c
13+70; namely, cavity 22 feet long, 13 feet wide, with an average clearance
6 inches above dry stone, which is thrown in over haunches and crown of the

Just the same as it was at 13+20. When I was before you
described 9+75 Champlain west. You asked me the question, I
if I could give you any idea of the dimensions of a certain portio
I have since been in and measured by my eye only, estimated
found this condition:

Found a cavity originally between pointed walls as follows: 18 feet long;
wall 4 feet 3 inches high; east wall 4 feet 9 inches high; in center 10 feet high
feet wide as average width. There are other quite large divisions between 9
10+23; also in Howard shaft; but time will not permit visiting them. Th
will represent the largest openings.

There are a number that you can stand up straight in, var
length from 8 to 14 feet, and from 9 to 16 feet in width.

Q. You are now speaking of a part of the tunnel that you t
about before?—A. Yes, sir. I have found some quite considerab
ties in Rock Creek west, and east also.

Q. Are they scattered along from point to point, or do they
one close division of the whole length?—A. The larger cavities
tended. Where there is a large room, as you might say, it has
nexes, which keep stretching out, in one place 188 feet long, r
down smaller and smaller.

Q. I will put you this question, Mr. Sparrow: Take the whole d
of the lining from the eastern end of Rock Creek east westward
distributing reservoir shaft; how long a distance is there in a
place where you found the lining to be at all full, no matter w
the packing was good or not, but where the cavity was filled?
hardly think it would exceed 200 feet, and I should not like to
on record as saying that it was full, because to me in this worl
ness of the filling means cavity.

Q. Yes, that is another thing, and I am coming to that in a
Covering the same total distance I last spoke of westward, how
continuous space of lining did you find that, from your acqua
with the subject and your actual inspection, you considered to b
oughly good? (And by "lining" I include lining and filling.)

The WITNESS. I understand you to mean from invert to inve

The CHAIRMAN. Yes, the whole thing; I want to know how
space in this last work of continuous distance you found this linin
as a whole reasonably satisfactory.—A. I should be compelled
not one foot.

Q. I think you stated that your soundings were taken every 5
as to cover the whole distance of the lining?—A. Yes, sir.

Q. What is the length from the east end of Rock Creek east
wardly through the tunnel to the present reservoir, of the lining
I believe there are some places where it is not lined.—A. Seve
sand one hundred and sixty-two feet, or near that.

Q. Is that all lining?—A. Yes, sir.

Q. What would be the effect, on work of this character in u
water-carrier under pressure or under filtration of water, inside

or both, of a soft, poor brick?—A. Speaking of brick alone, it would be but a short time before these brick would waste, crumble, and disintegrate, and would then form no obstruction to water flowing wherever it had an opportunity to flow back of same. But there are various opinions about the question of good brick being sufficient to hold water properly; yet, my opinion is that with proper material in the backing, and properly laid, the leakage through the cement and bricks would be of so little importance that we would call it, as a whole, well cared for, and find that the tunnel answered its purpose thoroughly.

Q. That is, if you had thoroughly hard-burned, well compounded, dark-colored brick, and first-rate cement, and the filling was made with first-rate cement and stone, and filled solidly behind and above, you think that the mere filtration through that kind of brick and that kind of cement would not be of any substantial consequence?—A. It would be of minor importance. I would also state that in case there should be a section of brick not so well burned as we would desire to have, yet, with proper backing, it would not be so great a disadvantage to the work. Although those brick would be liable to crumble and fall in time, yet if the backing was what it should be you have virtually remaining something that is of a much better quality to withstand wear and the action of the elements than the bricks themselves.

Q. That would be the same as a cement lining?—A. Exactly.

Q. You have been in that tunnel about how many times since you began?—A. I went in first on November 8, and there have been but very few days since that I have not been in the tunnel. I think I have been in possibly all the working days since then excepting about ten, when I was at work on my notes.

Q. How much water, judging from your observation, much or little, is coming into the tunnel during this period of time you have been there?—A. I am not qualified to give an estimate that I would care to have on record.

Q. I do not mean the number of gallons, but whether, from your knowledge and experience about works and everything else, there is considerable water coming in or very little?—A. There is considerable water coming in—considerable.

Q. Does it come in chiefly at some one place, or all along?—A. It comes in at different points all along the tunnel. There are places for quite a little distance, a number of hundred feet, perhaps, where there is not much water coming in; and then you will find at a distance from that where there is water coming in from the crevices and fissures in the rock, and also coming up from the bottom.

Q. Is there any pump or are there any pumps going there?—A. Yes, sir; there is one at Howard, one at Champlain, one at Rock Creek, and one at Foundry Branch shaft.

Q. Have they been at work about all the time, every day?—A. They have been at work every day, more or less every day and night.

Q. Have they kept the water out so that there are no pools of water on the bottom?—A. There are pools of water in several places that stand there, because of the grading of the tunnel.

Q. How deep are the deepest of those pools?—A. I should say about 7 or 8 feet.

Q. And how long?—A. There is one in Howard that is about between 75 and 100 feet.

Q. Is the bottom of the tunnel at that place where that pool of water stands lined with brick?—A. No, sir.

Q. Is it just the natural rock, smoothed down, or is it fixed with

cement and stone and so on, to make a bottom?—A. Answe
my, perhaps, overdesire to criticise, it is a muck bottom.

Q. Is it a bottom that has been smoothed, or is it as it has
by the excavation?—A. It results from the excavation.

Q. No systematic mason-work, either of stone or brick, has
there?—A. No, sir; not at that point.

Q. Through how much of the tunnel do you observe that th
artificially laid bottom?—A. That I have given no attention
could not answer.

Q. Is the tunnel tolerably well cleaned out at the bottom,
rubbish, what is called muck, left in considerable quantities s
Where there is a brick invert it is fairly cleaned out; but wh
are stone side walls and intended to leave the bottom as it w
nally excavated, it is not very well cleaned out.

Q. About how great length is there of brick invert work?—A
tell you, but I should have to refer to my record.

Q. Then just make a general statement.—A. I could not gi
fair estimate, because I haven't it in my mind.

Q. Can you not say whether you think it would be several
feet or a thousand?—A. I have sounded 14,746 feet, and I sho
two-thirds was brick invert. I may be entirely in error.

By Mr. CLEMENTS:

Q. You use the term "invert." What do I understand you
by that term?—A. I simply mean the bottom of the tunnel w
have these stone walls; when I speak of the invert proper, I
brick invert.

I would like to say that in examining the work of this tun
lining and above same, finding its condition as has been fou
defective, leads me to distrust the condition of the bottom u
stone bench walls, and if the pressure from the inside exceeds
the outside at any time, and if my theory is correct about th
loose material under these bench walls, it will pass off and be
and the bench walls will settle, and when they settle the lea
that will relieve the pressure from above and you have no su
your arch, as it stands on nothing. I would suggest that tha
taken into consideration by you gentlemen in making your re
deem it of great importance to the safety of this work. In f
aqueduct, in case it is filled rapidly, and there are fissures in
back of the lining, in which this water would pass off under
pressure, it would pass through the weakest point, which
under this wall, provided the wall was not properly cemente
bottom, and in passing would destroy the foundation and the w
fall.

Again, if the pressure was greater outside than inside it wo
the same tendency and effect in time upon these walls, and th
fall in either case.

My suggestion is that there should be an invert, either of co
of brick bottom, put in to sustain that or to make a continuou
this tunnel to prevent that pressure from outward inward or
ward outward, to save those walls.

Q. Do you think that a concrete bottom would avoid that dif
A. I do, if properly laid. I do not think that anything laid
have got it laid there, or have attempted to lay it, would be
I think with a concrete bottom well put in, hammered to flush
erly, under proper supervision, would sustain and obviate
culty.

By the CHAIRMAN:

Q. How thick would you have that concrete?—A. From 6 to 8 inches.

By Mr. RYAN:

Q. And continuous?—A. Continuous.

By the CHAIRMAN:

Q. That would take so much out of the carrying capacity of the tunnel, of course?—A. Yes, sir.

By Mr. DAWES:

Q. You can take the tunnel as it is constructed and add to it this concrete at the bottom for the purpose you have stated?—A. Yes, sir.

By Mr. CLEMENTS:

Q. Is the opinion you have just expressed based upon a personal inspection of the character of the rock and walls?—A. My opinion is based upon my experience in allowing a small stream of water to run under anything you have for a foundation. It will finally destroy it. You have got to stop that stream, I do not care if it is not bigger than a straw.

Q. Is the character of this rock such as to allow a small stream to pass under?—A. My testimony in this case is based upon the idea that I have found the work so defective that we can place no confidence in the character of the bottom upon which these walls rest. My opinion is that it is not worked down to and standing upon solid rock. It stands upon pockets, in my judgment, pockets of muck, this fine dust that has accumulated, from the blasting and also from waste, cement, and handling the material there; and the general disposition has been to let things slide as easily as possible; they did not want to be at the trouble and expense of excavating this cavity under the wall down until it was upon absolutely solid rock. I would also have that cemented perfectly solid to get something that will hold.

Q. Would you remove those walls?—A. No, sir; because you can confine that stuff that is there now and pack it solidly, and not have it washed away, and it will stand, in my judgment, for all time. It is under all the pressure that it will ever be possible to give it, and has got a foundation, if you can hold it there.

By Mr. RYAN:

Q. That you can do by putting in concrete work above the bottom of the wall?—A. Or make a passage to hold the water so that there will not be this starting out in all directions.

By Mr. DAWES:

Q. Making it absolutely tight?—A. Except a little leakage.

By Mr. CLEMENTS:

Q. Now, in relation to the filling behind the side walls, you have described a great many cavities here. Do you find any of them behind these side walls, or are they entirely over the arch?—A. I have not found it over the stone side walls, only behind the brick side walls. It is back of this brick invert, and there are also brick side walls, and back of them I have found these cavities, as I have designated them, which are loosely filled with dry stone crumbled in in all directions. For instance, if there was a projection of the rock like that [illustrating] coming out, and quite a little cavity, say 2 or 3 or 4 inches here, they would make the brick lining running here, and then here, and dump in a big rock that would not catch on, and would leave a small cavity. There are many

of those places where the stone has been put in roughly, lie there and form avenues that will allow leakage anywh makes the work sound very badly, and there is no strength to t Any pressure that is powerful enough to move stone will c stone away and spring the brick lining to a point where, if t weight from above, down comes the whole structure; so tha ment and knowledge is that those side walls should be filled

Q. That would require the taking out of a greater portion terial that is behind there now?—A. No, sir; my judgment proper management those side walls could be filled with grou will thereby acquire a great deal better job than you could expect, even if they had done their work acceptably. This g erly applied, cutting off the flowing ahead, will make those absolutely solid, properly applied, under from 100 to 150 pou ure; and when they are once made solid, with proper cemen proper temper, there is no such thing as disturbing those with any reasonable degree of pressure you could bring to be

Q. If those side walls were fixed in the manner that yo scribed, and then the arch were properly filled with cement you think it would make a secure conduit for the purposes in A. I do.

By Mr. RYAN:

Q. You speak of the leakages into the tunnel; are thos through the lined portion?—A. In some places.

Q. But practically through the unlined portions?—A. Some of it is weeping right through the brick-work; and ot in the brick-work there are weepers made to conduct the w whilst in the open rock it runs without being conducted naturally.

Q. What in your judgment would be the result of letting that tunnel for use in the condition in which it was left b tractors?—A. The fall or the grading of the tunnel is such water be let in as it flows naturally from streams and spri on, as I understand its construction, it would fill up at Ho first and flow back to Rock Creek before ever it would reach Consequently, the tunnel proper would fill up from the insid would from the outside; and then if water was applied fro tributing reservoir to fill the tunnel rapidly, it would cause upon the easterly end of the tunnel which, if it were a sudde would burst these brick walls; and my judgment is that whe first gave way and water found its place suddenly, the blow the water would be liable to tear down a great portion of the

By the CHAIRMAN:

Q. If, on the other hand, water was let in very slowly so fill up gradually, would that result be likely to follow?—A think not, with this exception: There is a great doubt in th all who are acquainted with this tunnel as to the outlet of may be put into that tunnel. I do not know to what extent is loose rock enough there, I would suppose, to waste wa and cause change enough by cropping out in new places on to perhaps undermine valuable property now standing, whil not disturb the brick lining at all.

By Mr. RYAN:

Q. I wanted to know how it would work practically. If were let in moderately from the reservoir for use, what w

fect?—A. My opinion is that the result would be disastrous because f the reaction or concussion when the lining should give way. If a rge mass of water like that, 10 feet high, is suddenly freed by a burst ou do not know how heavy a blow it is going to strike.

Q. You would regard it, on the whole, as unfit for the use for which was intended?—A. If it was a personal enterprise of my own, I ould not dare rely upon it.

Q. What would you do to render that tunnel suitable for the purposes for which it is intended?—A. I should stop or forbid any further onstruction, and commence at one extreme end of the shaft (either oward or west) and by the use of grout, fill the side walls where there ave been no considerable cavities discovered; the arch should be open, nd where there was a place for a man to work I would have it rubbled, nd rubbled solidly, and then apply grout to fill the vacancy between the laces where we could not reach to rubble it. I would go through with he present lining and get that substantially done, perhaps nearly all r quite all done. Then I would commence with the balance of the conruction, under proper supervision, and have every foot of it laid olidly, not having any one day's work passed without knowing that it as perfectly solid; and a man should be in charge that had the confience enough of the engineers, and honor enough to not let a day pass ithout he knows the condition of the work.

Q. You now refer to the unfinished portion?—A. To the unfinished ortion.

Q. Can you form any estimate of what it would cost to put the unnished portion into a suitable condition?—A. I am not competent to ake an estimate, because I have made no computations, and do not now the prices here of different materials. But I am impressed with hat I have been told in relation to the prices for that which has been one that it would have been sufficient to lay the balance, and do it ell and thoroughly, and I do not know that it is any too much. But is sufficient to complete that unfinished work, and do it as you dere it done, absolutely solidly.

Q. I did not understand you what you said would be sufficient?—A. ne prices, as I understand, that are now established by the contract do such work are sufficient to meet all expenses necessary to finish in that way.

Q. How much of the tunnel is unfinished?—A. There is in the neighorhood of 6,000 feet.

By Mr. DAWES:

Q. Six thousand feet out of how many thousand?—A. There is about ,000, or a little more in all, of the entire length.

Q. A little less than one-third?—A. A little less than one-third.

By Mr. RYAN:

Q. What I wanted to get at, as nearly as you can give the informaon, is how much would it probably cost to finish the portion of this nnel that purports to have been finished, and finish that portion of is tunnel in such perfect condition as to make it absolutely safe and itable for the purposes for which it was designed originally. (I want only approximately.)—A. From the thought that I have given it I ould not dare to mention a sum. I am not competent, because I have ot had that in view at all. I will say this, however, that every foot ken away that has to be rerubbled will cost at least four times as uch to do it now as it would at the time it was first constructed. Or,

in other words, if the actual cost of rubbling that work wa
yard originally, it will cost $10 a yard to do it now.

Q. Why?—A. In the first place, you have got to spend a
of time and money in making openings to get at this work; i
place, you have got to lose the material that you cut out in or
at it. Then you have to work at a great disadvantage in pa
material up through a smaller aperture, and men work at a
advantage in being doubled up. The men will have to rea
shove in with a trowel and so on, which makes them spend n
double the time doing the same amount of work; and then th
new material to supply the waste of the old. Altogether,
would come within bounds to say that it would cost four times

Q. I suppose that could not be done by contract very we
would have to be done by the Government by day's work, would
A. All that which comes under the present contract to be d
proper supervision, could be done under contract as well as
work. There is no trouble in my mind in having this work
contract as well as by day's work, provided that the system is
so that the men in charge, that is, the supervising inspector
perintendent of the work proper, has the authority and the k
of his business, and insists and demands that the subordin
follow a line or get off the work, and that the contractors sh
out their contract according to the specifications or stop.

Q. That would apply to the unfinished portions; but woul
encounter difficulty in letting this work by contract where th
not perfected, because of the difficulty of estimating what the c
be?—A. I would not think of such a thing as letting these re
new contractor.

Q. That is what I mean. I desire chiefly to direct your min
purports to be the finished portion of this tunnel, because my
to ascertain what it will cost to get that tunnel into a condition
it for the purposes for which it was intended. Now, I want t
whether, in your judgment, it would not be advisable to tak
lining out, and, instead of putting in that sort of lining, put
crete lining complete?—A. There are two or three questions
in there to influence an answer. I would say, bunching th
gether, that you have work there now that you can have util
when utilized and properly rubbled back of same, you have
as good a lining as you need, and about as good as you can g

Q. I am very glad to get that answer; but can you give me
what it would cost to utilize that?—A. I do not dare to mention
because the greatest experts I know of that have made estim
fallen far wide of the mark.

Q. Would it cost as much to utilize that as has been expend
lining?—A. No, sir. When you speak of the lining and inq
it would cost, I understand you to ask would it cost as muc
put that work in as good condition as I say it can be put in, a
it cost as much as it would do to do what has already been d
is, as I understand it.

Q. This is the question: Would it cost as much to put tha
a condition so that the whole of it could be utilized for the
for which it was intended as we have already expended upo
ing?—A. It would not cost as much.

Q. Would it cost half as much?—A. I am fearful it would.

Q. I understood you to state that there was not a foot of this li
was perfect, and that it would cost four times as much to m

perfect now as it would to have made the work perfect in the first instance. If that be so, how is it that you arrive at the conclusion that it will cost half as much to place this in a condition where it can be utilized—I mean this whole work that purports to have been finished—so that the tunnel can be utilized for the purposes for which it was intended as we have already expended in the lining?—A. I arrive at it in this way: In the first place, I do not think there is as great a proportion of that which we call a cavity as some estimate on the entire work. I spoke of that being filled, and in filling that it would cost four times as much to fill it as in the first place.

Q. Just that particular spot?—A. Just that particular spot, or these particular spaces which are spoken of. You asked a question in regard to lining. I understand you when you speak of lining that you speak of the tunnel entire, lining and filling.

Q. You are right—lining and filling.—A. Well, as I have stated, in my judgment, if the actual cost was $2.50 a yard, in the first place, in the process of doing the work over again the cost on an average now would be $10 a yard to do that same work, because of the disadvantages, etc. The repairing of other portions of the tunnel that did not have to be rubbled anew would not cost any such sum as that. The greatest cost would be in supplying the material. Most of that necessary to be repaired, or that would receive new material, is small apertures, channels, that would in the aggregate take a great quantity of material, but not a great quantity per lineal foot; so that, averaged with this greater expense, I think would not very much exceed over one-half of the original cost of this work.

Q. Now, if this work that purports to have been finished can be made safe and perfect for one-half that it has already cost us to put the lining in, would it not, in your judgment, be advisable to repair that work and utilize it for the purposes for which it was intended, rather than to abandon the tunnel altogether and adopt some other method of getting water?—A. Most assuredly; and even if it should cost three-fourths I would think it would be the cheapest way. Then when you get it done, and get it done effectively, I think you have one of the best conduits that you can devise, with the least future expense.

Q. Taking this tunnel in its present condition, if Congress should give you a discretion to get a water supply such as was intended by that tunnel, what would you do?

The WITNESS. Under the present circumstances?

Mr. RYAN. Yes.

A. I should repair that tunnel, most assuredly.

Q. You would then repair that tunnel rather than to adopt any other method of getting at the water supply?—A. I should. I would have to qualify that a little.

By Mr. DAWES:

Q. If you would bring an iron pipe of 4 feet in diameter over these same spaces, and then distribute the water from that for one-half of what it would cost to repair this tunnel, which would you do?—A. All things else being equal, I should take the iron pipe. But that brings up another question to my mind. Now, if it depends upon the idea of stretching an iron pipe through this present tunnel——

Q. I did not speak of that; but take an iron pipe without regard to the tunnel, as if the tunnel was not there.—A. An iron pipe is more apt to contaminate the water and get out of repair and need expense oftener, and a greater expense, in my judgment, than this tunnel would need if

properly finished; and in a long term of years, my judgment would be that it would be cheaper to finish this than it would be to stretch an iron pipe. So far as present cost is concerned, it would be better to stretch an iron pipe if the 4-foot pipe would supply the demand to carry the water to the sections from the new reservoir.

Q. You could not successfully use this tunnel without using this new reservoir?—A. I am not an engineer, and I would not like to place myself on record to give an opinion beyond my depth, but from the little education I have had in that line, I do not know why this city can not be supplied directly from that shaft as well as from that great reservoir.

Q. Is the reservoir good for anything else except a store-house?—A. As a store-house.

Q. That is all, is it? That is, you could use this tunnel just as well by means of a shaft?—A. That is my opinion; but, as I said, I am not an expert.

Q. Except you would not have the store-house?—A. We would not have the store-house in case of any accident to the distributing reservoir.

Q. Can you conceive of anything in hydraulics beyond the store-house that would give you any advantage in the reservoir?—A. Yes. There is a chance for having your water filtered a little before it goes through the pipes by having a store-house. I do not know that the water is any purer, but it looks a little clearer, and it certainly can be relished a little better.

Q. Have you considered the question of the reservoir in the light of a menace to the safety of the city below its walls?—A. I would really like to be excused from saying anything about that reservoir. I have heard experts express their opinion somewhat, and I may be prejudiced for or against it in relation to what I have heard them say, because I put great confidence in their judgment.

Q. Have you any knowledge about it?—A. I have no personal knowledge, except what I have said in relation to these men.

Q. What engineers do you refer to?—A. Those opinions were not full, but I gathered from opinions expressed—not that there was any special detailed opinion given—but the gentlemen I have heard speak of it were Colonel Flad, Mr. Graffe, and Mr. Wilson.

Q. Suppose a reservoir to be constructed in as substantial a manner as could reasonably be expected, with all the fidelity that could be reasonably hoped for in its construction, what would be your opinion, after all that, upon the subject of its being anything of a menace to the city below?—A. I should not think it would be any source of trouble or apprehension of danger specially. Of course there is always danger, but I would not consider it being a dangerous thing. It might be dangerous in the immediate locality, on account of sanitary considerations.

Q. I do not speak of that; I mean the danger of its breaking loose?—A. I would not consider it extremely dangerous, although there is a liability of wide destruction.

Q. When you reach the point of danger to health it would have passed the point of safety for use, would it not?—A. Well, it would seem so, from a sanitary point of view; but I presume, if we knew, there are a great many streams and reservoirs that are dangerous to health in their neighborhood, and yet we survive them.

Q. That is on the principle of the survival of the fittest, is it not?—A. Yes, sir.

Q. We survive, but are you confident that everybody else survives?—A. No, sir; some suffer and die and others suffer and survive.

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TO

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DOCUMENTS.

[Committee No. 1.]

WAR DEPART
Washington City, Octobe

SIR: I have the honor to transmit a letter of the 27th instant from the
gineers relative to the work on the Washington Aqueduct tunnel, with c
tain papers relating thereto, the same being transmitted in response to y
the 24th instant, inclosing a copy of the concurrent resolution of Congre
ing the appointment of a joint select committee to investigate the subjec

The Chief of Engineers states that the accompanying copies are all tha
possible to prepare in the limited time given by the committee, and that
ing papers will be submitted as soon as the clerical force of his office
them.

Very respectfully,

WM. C. ENDI
Secretar

Hon. J. C. CLEMENTS,
Of Joint Select Committee on Washington Aqueduct Tunnel.

[Committee No. 2.]

OFFICE OF THE CHIEF OF ENGINEERS, U. S. A
Washington, D. C., October

SIR: In compliance with the letter from the clerk of the joint select c
make injuiry touching the work on the Washington Aqueduct tunnel
October 24, 1888, and referred to this office for report, I have the honor
herewith the following papers, viz:

Appendixes Q Q., 1883, R R., 1884, U U., 1885, S S., 1886, V V., 1887
being the Annual Reports of the Chief of Engineers and the officer in ch
Washington Aqueduct tunnel from the commencement to the current yea

Copies of affidavits of William and George Kendall and of Thomas Luc
defective work and bad material in the construction of said tunnel.

Copy of report of Major G. J. Lydecker, Corps of Engineers, in r
charges contained in said affidavits.

List of employés who have been employed on said tunnel.

One copy of advertisement inviting proposals for construction of aque

Seven copies of proposals received.

Seven copies of bidders' bonds accompanying proposals.

Seven copies of bidders' justifications.

One copy of abstract of proposals.

One copy of letter of Maj. G. J. Lydecker, Corps of Engineers, dated O
with indorsements, in the matter of the claim of J. H. Dewees to be en
contract.

One copy of letter of Oct. 22, 1883, from Dewees with indorsement.

One copy of memoranda relating to bid of J. H. Dewees.

One copy of articles of agreement, being the contract with Beckwith
enbush for construction of Washington Aqueduct tunnel.

One copy of supplementary articles of agreement with same, dated O

One copy of supplementary articles of agreement with same, dated

One copy of letter of Major Lydecker, dated Dec. 8th, 1887, transmitt
above-mentioned articles of agreement.

A copy of the supplementary articles of agreement dated May 8th, 1888, with Beckwith and Quackenbush, will be found on pp. 10, 11, and 12, of Appendix Y Y, 1888, above mentioned, and herewith inclosed.

These are all the papers in the case that it has been possible to prepare in the limited time given by the committee. The remaining papers will be submitted as soon as the clerical force of the office can prepare them.

In this connection I would respectfully invite your attention to the fact that work on the tunnel will stop on the 31st instant, and suggest the propriety of a request to the committee that they make an examination of the tunnel before work ceases.

In reply to the fourth specification of the letter I would say that this office has no knowledge of any "subcontracts or other documentary information * * * touching the terms and conditions of the letting of the work on said aqueduct tunnel by the contractors with the Government to subcontractors."

Very respectfully, your obedient servant,

THOS. LINCOLN CASEY,
Brig. Gen., Chief of Engineers.

Hon. WM. C. ENDICOTT,
Secretary of War.

[Committee No. 1.]

INCREASING THE WATER-SUPPLY OF WASHINGTON, D. C.

[From Annual Report for 1888.]

This work was commenced pursuant to an act of Congress approved July 15, 1882, and includes as its salient features: (1) Raising the dam in the Maryland Channel at the Great Falls of the Potomac to an elevation of 148 feet above mean high tide at the Washington navy-yard, and its extension at that height across Conn's Island and the Virginia Channel of the river; (2) extending the Washington Aqueduct from the distributing reservoir, near Drover's Rest, to the site selected for the new reservoir, near Howard University, the plan adopted for this extension being a tunnel under pressure 29,696.3 feet long; (3) constructing at the tunnel outlet a reservoir of about 300,000,000 gallons capacity; (4) connecting the new reservoir with the existing system of water mains in the city of Washington by a new line of large mains.

Operations during the past fiscal year have been chiefly on the tunnel and reservoir, the dam having been finished in August, 1886, and the new mains laid up to the site of the reservoir in 1885.

The following is an outline of the history of operations during the year, and further details are given in the report of Lieut. C. McD. Townsend, Corps of Engineers, submitted herewith:

DAM AT THE GREAT FALLS.

Operations on this portion of the work were completed, as before stated, during the fiscal year ending June 30, 1887, but the urgent deficiency bill passed by Congress early in the present session, and approved February 1, 1888, contained the following item of appropriation: "To enable the Secretary of War to pay to Chittenden Brothers, contractors, for money expended in the construction of a dam at the Great Falls of the Potomac over and above that contemplated in the contract with said Chittenden Brothers, as amended, the sum of fifteen thousand dollars, payable from any unexpended balance of money appropriated for the construction of such dam." In accordance with the foregoing, payment was duly made to the said Chittenden Brothers on the 11th of February, 1888. This was the only expenditure made on account of the appropriation for the dam during the past fiscal year, leaving on hand June 30, 1888, a balance of $4,665.52.

The total amount appropriated for this part of the work was $145,151.00, and the expenditures therefrom have been as follows:

Paid to contractors for contract work, as per detailed statement in my last annual report	$114,509.02
Paid to contractors pursuant to special appropriation of February 1, 1888	15,000.00
Total paid to contractors	129,509.02
Expenses of surveys, engineering, superintendence, etc	10,976.46
Balance available	4,665.52
Total appropriation	145,151.00

TUNNEL FOR AQUEDUCT EXTENSION.

At the beginning of the fiscal year the tunnel had been "holed" through, 6,110 feet had been lined, and operations were in progress under Beckwith & Quackenbush, contractors.

Work under this contract was continued until September 30, 1887, but with a light force on account of the small balance of money remaining on hand, and operations were limited to trimming and enlarging the tunnel to the necessary lining section, and to placing the masonry lining in parts where the worst character of rock was found. Finally, the money having become about exhausted, all work of construction was suspended on the 30th of September, 1887, and the contractors were directed to clear the tunnel of all refuse and débris, in order to permit a final measurement of the work done by them up to the date of suspension. This having been accomplished, settlement was made with the contractors, including a payment of $78,279.50 of the amount that had up to that time been withheld as a retained percentage. This was done pursuant to supplemental articles of agreement dated December 5, 1887, which also provided for the care of the tunnel during the period of suspension of work, and for the preliminary work of pumping the tunnel clear of water, as soon as a new appropriation by Congress should make a resumption of active operations possible. These articles were as follows:

"Supplemental articles of agreement entered into this 5th day of December, eighteen hundred and eighty-seven (1887), between Major G. J. Lydecker, Corps of Engineers, U. S. Army, of the first part, and Clinton Beckwith and John V. Quackenbush, partners, doing business under the firm name of Beckwith & Quackenbush, of Mohawk, of the county of Herkimer, State of New York, of the second part; these articles, now herein named, being in furtherance of and supplementary to certain articles of agreement entered into by the parties aforesaid relating to the construction of a tunnel for increasing the water supply of Washington, D. C., on the 29th day of October, 1883, and to certain supplemental articles of agreement concerning the same, and between the same parties, entered into on the 18th day of October, 1886.

"Whereas by reason of the exhaustion of appropriations heretofore made for the conduct of the work in question, it has become necessary to suspend active operations thereon under the original and supplemental articles hereinbefore referred to, and to the advantage of both parties therein concerned to make provisions for the protection of their mutual interests during the period of such suspension, which must endure until a further appropriation by the Congress of the U. S. makes a resumption of the work possible: Therefore,

"This agreement witnesseth, that the said Major G. J. Lydecker, Corps of Engineers, for and in behalf of the United States of America, and the said Beckwith & Quackenbush, for themselves, their heirs, executors, and administrators, have mutually agreed and by these presents do mutually covenant and agree to and with each other as follows:

"First. That, in consideration of the work already done to the satisfaction of the party of the first part, and of the further consideration that the entire work in contemplation can not be completed under any contract in which the parties of the second part are now concerned, the party of the first part shall surrender and pay to the parties of the second part the sum of seventy-eight thousand two hundred and seventy-nine dollars and fifty-one cents ($78,279.51), such sum being eighty-five (85) per cent. of the percentage heretofore retained and withheld from the parties of the second part as a guarantee for the faithful performance of their work as provided in the original articles of agreement.

"Second. That the parties of the second part may defer the removal of machinery, rubbish, and refuse material from the site of the work, as provided in the original specifications relating thereto, until required to do so by the party of the first part, after an appropriation for the resumption of operations shall have been made by Congress; and when such removal shall have been effected to the satisfaction of the party of the first part, final payment of all sums justly due to the parties of the second part will be completed, but if such removal shall not have been effected within thirty (30) days after being ordered the balance of all retained percentages or other moneys due the parties of the second part shall be forfeited to the United States; provided the order for such removal shall not be given within five (5) days after the award of a new contract for continuing work on the tunnel; and provided further, that no such order of removal will be given at that time (1st) if the parties of the second part remain as contractors on the work, to complete it, or (2nd) if within the five (5) days aforesaid they arrange with their successors on the work for the transfer to such successors of all responsibility in relation to such removal in a manner and under conditions satisfactory in all respects to the party of the first part; whereupon in either of these two cases final settlement on account of contracts now existing will be made in such manner as may then be found to be just and proper.

"Third. That the pumping machinery at Foundry Branch and Rock Creek shafts shall be kept in proper working order for service at all times by the parties of the second part, so that it may be at any time put into active operation on the orders of the party of the first part; and to that end there shall be in daily service on the work one competent engineer (who shall also be a machinist), whose duty it shall be to care for such pumping machinery, and who shall receive as compensation for such service from the party of the first part the sum of sixty dollars ($60.00) for each calendar month, to date from the day on which these articles of agreement may go into effect as hereinafter provided.

"Fourth. That the party of the first part shall, at his option, put into active service the pumping machinery at both or either of the two shafts named in the foregoing paragraph, at any time during the suspension of work hereinbefore referred to, paying to the parties of the second part the sum of three dollars ($3.00) for each day of twenty-four (24) hours that each set of pumping machinery shall be in active use; it being understood that the party of the first part shall control and pay for all necessary operating expenses in connection with such active pumping operations.

"It is understood and agreed that nothing herein contained shall be construed to release from, or add to, any obligation, liability, right, or duty devolving on either party under the operations of the two several articles of agreement to which the foregoing are supplemental.

"It is further understood that these supplemental articles of agreement are to become operative only when approved by the Chief of Engineers and the Secretary of War, and if not so approved to be void and of no effect whatever.

"In witness whereof the undersigned have hereunto placed their hands and seals the date first hereinbefore written.

"G. J. LYDECKER, [SEAL.]
"*Major of Engineers, U. S. A.*
"BECKWITH & QUACKENBUSH. [SEAL.]

"Witnesses:
"SIMON NEWTON.
"JOHN M. LASKEY.
"(Executed in quintuplicate).

"OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
"*Dec.* 15, 1887.

"Approved.

"CHAS. W. RAYMOND,
Acting Chief of Engineers."

[2nd Indorsement.]

"WAR DEPARTMENT,
"*December* 19, 1887.

"Approved.

R. MACFEELY,
Acting Secretary of War."

After the suspension of work the tunnel was allowed to fill with water, thereby avoiding the expense of pumping operations and providing a moderate test of the strength of lining already constructed in resisting the outward pressure of water.

The act of Congress—general deficiency—approved March 30, 1888, included the following item of appropriation:

"To enable the Secretary of War to complete the work of increasing the water supply of the city of Washington, under the act entitled 'An act to increase the water supply of the city of Washington, and for other purposes,' approved July fifteenth, eighteen hundred and eighty-two, namely: For completion of lining of the tunnel, two hundred and ninety-seven thousand seven hundred and fifty dollars; for completing shafts, west connection, and for superintendence and engineering, thirty-seven thousand two hundred and fifty dollars; and for general contingencies of the work, twenty thousand dollars; in all, three hundred and fifty-five thousand dollars; all of said work to be completed by November first, eighteen hundred and eighty-eight; said sum to be subject to all the provisions and restrictions of the said act of July fifteenth, eighteen hundred and eighty-two, and of the act approved July fifth, eighteen hundred and eighty-four, making appropriations for the expenses of the government of the District of Columbia, as to its apportionment and settlement between the United States and the District of Columbia, and the refunding thereof. The work above provided for to be done under the contract heretofore made, or by a reletting, as in the discretion of the Secretary of War shall be most promotive of the interest of the Government: *Provided*, That no contract shall be made at prices greater than the prices allowed under contract under which work has been heretofore done on said tunnel."

Immediately on the passage of this act the necessary measures for resuming operations at the earliest day possible were inaugurated. To this end the work of pumping out the tunnel was commenced at once, under the supplemental articles of agreement hereinbefore quoted, and additional articles were entered into with the same contractors for completing the work of lining. One of the most urgent reasons, if not indeed the controlling one, for continuing the same contractors on the work was a proviso in the act of appropriation, which required the completion of the work by November 1, 1888. It was clearly impossible to comply with this requirement, but quite evident that the nearest approach thereto would be by avoiding the long delay that would necessarily follow advertisement for new bids, a reletting of the work, and the establishment thereon of new contrators and a new working plant.

These new articles of agreement are as follows:

"Supplemental articles of agreement entered into this 8th day of May, eighteen hundred and eighty-eight (1888), between Major G. J. Lydecker, Corps of Engineers, U. S. Army, of the first part, and Clinton Beckwith and John V. Quackenbush, partners, doing business under the firm name of Beckwith & Quackenbush, of Mohawk, of the county of Herkimer, State of New York, of the second part; these articles, now herein named, being in furtherance of and supplementary to certain articles of agreement entered into by the parties aforesaid, relating to the construction of a tunnel for increasing the water supply of Washington, D. C., on the 29th flay of October, 1883, and to certain supplemental articles of agreement concerning the same, and between the same parties, entered into on the 18th day of October, 1886, and on the 5th day of December, 1887.

"Whereas the urgent deficiency act of Congress approved March 30, 1888, appropriates the sum of $355,000 for completing the Washington Aqueduct tunnel, heretofore in process of construction under the contract and supplemental articles of agreement above named, and whereas said act provides: (1) That all the work shall be completed by November 1, 1888; (2) that it may be done under the contract heretofore made or by a reletting as in the discretion of the Secretary of War shall be most promotive of the interest of the Government; and (3) that no contract shall be made at prices greater than the prices allowed under contract under which work has been heretofore done on the tunnel. And whereas the Secretary of War has determined that it will be the most promotive of the interest of the United States to complete the said tunnel work under the contract and articles supplemental thereto hereinbefore referred to, provided the parties thereto subscribe to the conditions hereinafter named: Therefore,

"This agreement witnesseth, That the said Major G. J. Lydecker, Corps of Engineers, for and in behalf of the United States of America, and the said Beckwith & Quackenbush, for themselves, their heirs, executors, and administrators, have mutually agreed and by these presents do mutually covenant and agree, to and with each other as follows:

"First. That the parties of the second part shall continue to completion, so far as the money already appropriated shall suffice, the work on the tunnel aforesaid; it being expressly understood that the parties of the second part will use all means in their power to complete the work by the 1st day of November, 1888, and that all instructions from the party of the first part concerning the steps to be taken to secure completion on said date shall be promptly obeyed and rigidly adhered to. It is also understood that the tunnel lining to be done under these supplemental articles of agreement will include three classes, viz: First, brick arch, side wall, and invert—such as has heretofore been applied to the work, substantially as shown on tracing hereto attached in section marked "A;" second, rubble masonry side walls, and two-ring brick arch, substantially as shown on the tracing hereto attached in section marked "B;" third, rubble masonry side walls, and three-ring brick arch, substantially as shown on tracing hereto attached, in section marked "C." The backing in all cases to be of rubble masonry such as called for in previous articles of agreement. The rubble masonry side walls contemplated herein will be not less than eighteen (18) inches in thickness, and constructed throughout in accordance with the following:

"Specifications for rubble side walls: The rubble side walls provided for in these articles will be constructed of clean, sound, and durable stone, selected for the purpose; they must be carefully laid in cement mortar, in such manner as to fit approximately, being roughly shaped with the hammer if necessary to make such fit. Mortar must be freely used so as to solidly fill all spaces between stones, and to bulge out beyond the face joints when the stone is placed in position, the object being to make the wall as nearly water-tight as possible. The face of the wall must be laid true to the lines given and so that projections shall not extend more than one and one-half (1½) inches beyond the designated plane of the face; the facing joints shall be neatly outlined and finished, and the top of the wall shall be truly leveled to the springing of the brick arch.

"It is further agreed that payment for the aforesaid work of lining shall be as follows: For full lining of 1st class, forty dollars ($40) per linear foot of tunnel so

lined; for lining of 2d class, twenty-four dollars and fifty cents ($24.50) per linear foot of tunnel so lined; for lining of 3d class, twenty-eight dollars and fifty cents ($28.50) per linear foot of tunnel so lined; the prices aforesaid being no greater than those allowed under the contract under which work has heretofore been done on the tunnel, and such as will insure the completion of the work within the limits of the sum appropriated therefor. It is expressly understood that the prices paid, as above, include compensation for all work and material necessary for the solid lining of the tunnel in the several classes, as well as the work of enlarging the tunnel from the normal cross-section to that required for placing the designated lining.

"It is further stipulated and agreed that all brick work in the lining of the tunnel shall be done by expert brick masons, and that the stone work of said lining shall be done by expert stone masons.

"In consideration of the first proviso of the urgent deficiency act hereinbefore named, it is also understood and agreed that if work on the tunnel is not completed by the 1st day of November, 1888, the parties of the second part may, at their option, continue to prosecute the work within the limits provided for by the appropriation of $355,000 made by Congress in the act herein named, but no payment for such work done, or material furnished, after said date, shall be made until Congress shall have extended the time for the completion of the work, unless the Secretary of War shall then determine that the time for completion under these articles of agreement may be extended, and shall thereupon expressly authorize payment to be made, in the usual manner, for the work done during the period of extension.

"It is further understood and agreed that nothing herein contained shall be construed to release from or add to any obligation, liability, right, or duty involved in the original contract of October 29th, 1883, or any articles of agreement supplemental thereto, so far as concerns the parties in interest, except as specifically provided in these final supplemental articles now signed and dated this 8th day of May, 1888, which said final articles are to become operative only when approved by the Chief of Engineers, U. S. Army, and the Secretary of War.

"In witness whereof the undersigned have hereunto placed their hands and seals the date first hereinbefore written.

"G. J. LYDECKER, [SEAL.]
"*Major of Engineers, U. S. A.*
"BECKWITH & QUACKENBUSH, [SEAL.]

"Witnesses:
"SIMON NEWTON.
"JOHN M. LASKEY.

"Approved May 9, 1888.

"J. C. DUANE,
"*Brig. Gen., Chief of Engineers.*"

[1st indorsement.]

"WAR DEPARTMENT,
"*May 10th*, 1888.

"Approved.

"WM. C. ENDICOTT.
"*Secretary of War.*"

It will be observed that the above articles provide for three classes of lining: 1st, "brick arch, side wall, and invert, such as has heretofore been applied to the work;" this will cost $40.00 per lin. foot, and was designed to be used in only about 325 feet of the length then remaining to be lined; 2nd, "Rubble side walls, and two-ring brick arch," costing $24.00 per lineal foot, and designed for about 11,344 feet; 3d, "rubble masonry side walls, and three-ring brick arch," costing $28.50 per linear foot, and designed for a few short sections of tunnel, aggregating in length about 250 feet.

The tunnel having been cleared of water showed that no damage had been done by allowing it to fill; the working plant was put in order and the work of placing lining was resumed in the latter part of May, and operations to that end are now in progress in all sections of the tunnel. The total length of tunnel lined during the year was only $3,959\frac{5}{10}$ linear feet, but of this 1,186 were placed during the past month (June, 1888). The total length lined to June 30, 1888, is 10,069½ feet, and there then remain $10,626\frac{8}{10}$ feet to be lined.

The contractors have as yet by no means made such arrangements as are requisite to finish the entire work at the earliest possible date, in spite of repeated directions from this office having that object in view. Especially has progress in the heading east from Foundry Branch working shaft been unsatisfactory, less lining having been placed in that section than in any other, whereas the greatest distance to be

lined is in that one. It is hoped and believed, however, that the contractors will soon see the necessity of changing their course in this respect and comply with the directions given for their guidance, and thereby avoid the stipulated penalty of persistent refusal to comply with the requirements of their contracts.

The total estimate of work done by the contractors on the tunnel up to June 30, 1888, is as follows:

76,161 cubic yards excavation in tunnel, at $8	$609,288.00
2,148.75 cubic yards earth excavation in shafts, at $6	12,892.50
2,676 cubic yards rock excavation in shafts, at $10	26,760.00
10,891 cubic yards brick masonry in tunnel, at $14	152,474.00
2,339 cubic yards concrete masonry in tunnel, at $5	11,695.00
4,936.72 cubic yards dry stone packing in tunnel, at $2.50	12,341.80
383 cubic brick masonry in shafts, at $18	6,894.00
600 cubic yards concrete masonry in shafts, at $5	3,000.00
930 cubic yards dry stone packing in shafts, at $2.50	2,325.00
444 linear feet air-shafts, complete, at $15	6,660.00
637.78 cubic yards extra excavation, at $1.50	956.67
15,926 cubic yards rubble masonry in tunnel, at $4.75	75,648.50
1,295 linear feet tunnel lining, 2d class, at $24.50	31,727.50
Total for contract work	952,662.97

Payment on account of the above has been made to contractors as follows:

On montly estimates	$857,396.68
85 per cent. of retained percentages on work done prior to September 30, 1887	78,279.51
Balance due on contract work	16,986.78
	952,662.97

The cost of work done during the past year, included in above statement, was $124,417.70.

In addition to the above total there have been expended for aqueduct extension the following sums:

For west connecting conduit (1886)	$5,005.58
For pumping during suspension of operations, 1886	7,035.00
For pumping under supplemental articles dated Dec. 5, 1887	2,830.36
For engineering, superintendence, and contingencies, including cost of preliminary surveys and examinations (1882–1888)	44,339.45
	59,210.39

This, added to the total cost of work done under contract ($952,662.97), makes the grand total of expenditures up to June 30, 1888, including outstanding liabilities and retained percentages, $1,011,873.36.

The appropriations have been as follows:

Act approved July 15, 1882	$599,534.55
Act approved March 26, 1886 (pumping)	5,000.00
Act approved August 4, 1886	395,000.00
Act approved March 30, 1888	355,000.00
Total	1,354,534.55

Deducting therefrom the total expenditures and liabilities for work already done to June 30, 1888 ($1,011,873.36), the balance available at that date was $342,661.19, the expenditure of the greater part of which is provided for by existing contracts. As nearly as can now be determined this sum will suffice for the completion of the work, in all its essential features, wherefore no estimate for any additional appropriation is submitted at this time.

NEW RESERVOIR.

The contract with Maloney & Gleason for the completion of this part of the work expired June 30, 1887, at which time there remained about 50,000 cubic yards of excavation and 12,000 square yards of slope paving, together with a small amount of sodding to be done in order to complete so much of the reservoir as it was proposed to do under the contracts mentioned above. Accordingly, it was determined to make a further extension of time, and this was done subject to the condition that the con-

tractors should forfeit to the United States the sum of $300 for each calendar month during the period of suspension, pursuant to the following supplemental articles of agreement:

"Supplemental articles of agreement entered into this 20th day of July, eighteen hundred and eighty-seven (1887), between Major J. G. Lydecker, Corps of Engineers, U. S. Army, of the first part, and Patrick Maloney and Andrew Gleason, partners, doing business under the firm-name of Maloney & Gleason, of Washington, of the District of Columbia, of the second part:

"Whereas on the 30th day of October, 1883, the parties above named entered into a contract for the construction of a reservoir for increasing the water supply of Washington, D. C., whereby it was provided that the work should be completed by or before the 30th day of June, 1885;

"And whereas the time for completing the aforesaid work has, by successive extensions, been prolonged to June 30th, 1887, at which date the same was still unfinished, and the parties of the second part has made application for additional time in which to comple the work aforesaid:

"Therefore this agreement witnesseth, that the said Major G. J. Lydecker, Corps of Engineers, for and in behalf of the United States of America, and the said Maloney & Gleason, for themselves, their heirs, executors, and administrators, have mutually agreed, and by these presents do mutually covenant and agree, to and with each other as follows:

"That in consideration of a further extension of time, whereby the party of the second part may be allowed the aditional period of four (4) calendar months (viz, from June 30th, 1887, to October 31st, 1887) within which to complete so much of the work on the reservoir aforesaid as shall be required of said party of the second part by the party of the first part, the party of the second part shall forfeit to the United States the sum of three hundred dollars ($300) per month during each month of such period of extension, in order to make good, in part, the additional cost of supervision and inspection to which the United States will be subjected by reason of such extension; and the said sum of $300 shall be deducted monthly from the amounts found due to the parties of the second part for each calendar month, or part thereof, during which operations—under the original contract, hereinbefore referred to, dated October 30th, 1883, and under these supplemental articles of agreement—shall be continued.

"It is further understood and agreed, that all provisions of the original contract aforesaid, not inconsistent with these supplemental articles of agreement, shall remain of full force and effect, and that nothing herein contained, or implied, shall bind the United States to allowing the parties of the second part any additional time in which to complete all the work required of them under the said original contract.

"In witness whereof the undersigned have hereunto placed their hands and seals the date first hereinbefore written.

"G. J. LYDECKER, [SEAL.]
"*Major, Engineers, U. S. A.*
"MALONEY & GLEASON. [SEAL.]

"Witnesses:
"SIMON NEWTON,
"JNO. C. FAY,
"JOHN P. SHEPPERD.

"OFFICE OF THE CHIEF OF ENGINEERS, U. S. A.,
"*July* 26, 1887.

"Respectfully submitted to the Secretary of War, with recommendation for approval.

"J. C. DUANE,
"*Brig. Gen., Chief of Engineers.*

"WAR DEPARTMENT *July* 28, 1887.

"Approved: By order of the Secretary of War.

"SAML. HODGKINS,
"*Acting Chief Clerk.*"

Work was continued until October 31, 1887, when the desired results having been accomplished, operations under contract with Maloney & Gleason were closed, and, after considerable expenditure of time in surveys and recomputations for final settlement, payment was made March 19, 1888. This settlement was not satisfactory to the contractors, and they have since that time presented claims for additional compensation, the consideration of which is now pending.

The total estimate for work done by the contractors on the reservoir to the date of stopping work, and which was the basis of settlement with them, was as follows:

Items.	Work done.				
	To June 30, 1887.	During year ending June 30, 1888.	Total.	Price per yard, etc.	Cost.
Excavation.....cubic yards..	828,515	44,122	872,637	$0.30	$261,791.10
Puddling.....do....	61,117	215	61,332	.40	24,532.80
Sodding.....square yards..	.....	7,440	7,440	.20	1,488.00
Cut-stone masonry.....cubic yards..	4.5	.....	4.5	15.00	67.50
Brick masonry.....do....	930	.....	930	9.00	8,370.00
Concrete masonry.....do....	9,690	.....	9,690	5.50	53,295.00
Rubble masonry.....do....	104	.....	104	6.00	624.00
Trap-rock lining.....square yards..	5,077	.....	5,077	1.00	5,077.00
Broken stone.....cubic yards..	10,177	2,126	12,303	2.00	24,606.00
Paving.....square yards..	52,690	9,342	62,032	.28	17,368.96
Coping.....linear feet..	40.9	.....	40.9	5.00	204.50
Cast iron drains.....do....	382	.....	382	.75	286.50
Pine plank.....M feet, B. M..	90,033	.....	90,033	30.00	2,700.99
					400,412.35

Amount of forfeit to the U. S. for part cost of supervision and inspection, as per supplemental articles of agreement dated July 12, 1887...	$1,200.00
Amount paid contractors.....	399,212.35
	400,412.35

Of the above total $21,678.36 is for work done during the past fiscal year. In addition there has been expended for stone, trap-rock, and brick furnished to contractors, $43,032.90, and for surveys, engineering, contingencies, etc., since the beginning, the sum of $62,684.63, making the total expenditures to June 30, 1888, $504,929.88.

The appropriations have been as follows:	
Act approved July 15, 1882.....	$431,273.75
Act approved August 4, 1886.....	160,000.00
Total.....	591,273.75
Deducting therefrom the total of expenditures ($504,929.88), the balance available for completing the work at the close of the fiscal year was...	86,343.87

In order to complete this part of the work to the extent necessary for service in connection with the increased water supply, a gate-house (combining influent and effluent) is to be built, the side slopes of reservoir in vicinity of gate-house graded and paved, and the circulating conduits built. The balance of appropriation in hand will probably be sufficient for the work above indicated. After that is done with requisite means for fencing and for properly finishing the grounds about the reservoir should be provided, but it is not deemed expedient to submit any estimate therefor at this time.

LAND.

The only payment for land during the year was that of May 26 to Martha J. Coston for $77.50 on account of land to extend aqueduct. All previous payments are given in the annual reports of the Chief of Engineers for 1885, 1886, and 1887.

Of the sum originally appropriated ($45,000) to pay for land and water rights at the Great Falls only $117.96 has been expended, as stated in previous reports, no expenditure having been made therefrom during the past year. The settlement of questions concerning these matters is still pending in court in charge of the Attorney-General.

The total of expenditures made from this office on account of land condemnation up to June 30, 1888, is as follows:

For "land to extend aqueduct".....	$26,439.51
For "land for reservoir".....	209,435.72
For "water rights and land to extend dam at Great Falls".....	117.96

The balances of appropriations available for the above-named purposes June 30, 1888, were as follows:

For "land to extend aqueduct"	$24,930.49
For "land for reservoir"	814.28
For "water rights and land to extend dam at Great Falls"	44,882.04

MAIN CONNECTIONS.

No work has been done on the main connections during the year. In July a small force was employed to remove the 75" pipe, which had been left on the grounds of the Howard University, to the site of the new reservoir, at an expense of $19.40, the only disbursement during the year.

The total expended on account of main connections to June 30, 1888, were as follows:

For water pipe, valves, and special castings	$122,029.78
For pay-rolls for labor, superintendence, etc	25,641.42
For materials, tools, supplies, etc	11,800.49
For hauling pipe from depots, etc	3,939.13
Total	163,410.82

The original appropriation was $165,400, and the balance now available is $1,989.18, which will probably suffice to complete this part of the work by making proper connection with the gate-house when built.

The following is an abstract of contracts for increasing the water supply of Washington, D. C., in force during the fiscal year ending June 30, 1888:

For tunnel.—Beckwith & Quackenbush, of Mohawk, N. Y., contractors; date of contract, October 29, 1883; dates of supplemental contracts, October 18, 1886, December 5, 1887, and May 8, 1888. The specified time for completing work under these several contracts is November 1, 1888, but it is not deemed possible to do so within that limit of time.

For reservoir.—Maloney & Gleason, of Washington, D. C., contractors; date of original contract, October 30, 1883; expired June 30, 1887, and extended under supplemental articles of agreement dated July 20, 1887, to October 31, 1887.

The following is a money statement for the fiscal year ending June 30, 1888:

Title of appropriation.	Amount unexpended July 1, 1887.	Expended during the year.	Amount unexpended June 30, 1888.	Outstanding liabilities, including retained percentages.	Amount available June 30, 1888.
Land to extend aqueduct	($25,007.99 / 355,000.00)	$77.50	$24,930.49	.....	$24,930.49
Extension of aqueduct	241,777.24	210,207.97	386,569.27	$43,908.08	342,661.19
Main connections	2,008.58	19.40	1,989.18	.....	1,989.18
Land for reservoir	814.28	.....	814.28	.....	814.28
Constructing reservoir and gate-house	159,646.59	73,302.72	86,343.87	.....	86,343.87
Water rights and land to extend dam at Great Falls	44,882.04	.....	44,882.04	.....	44,882.04
Completion and extension of dam at Great Falls	19,665.52	15,000.00	4,665.52	.....	4,665.52
Aggregate	848,802.24	298,607.59	550,194.65	43,908.08	506,286.57

Appropriated by act of March 30, 1888.

The above statement has reference only to disbursements made from this office. In addition the sum of $611.24 was disbursed directly from the U. S. Treasury Department for advertising, but I have not been advised to what specific item of appropriation such expenditure was charged, but it related to the acquisition of land and water rights, and is supposed to have been charged accordingly. Deducting this amount ($611.24) from the total available June 30, 1888 ($506,286.57), leaves $505,675.33. Of this amount an expenditure of the greater part of the balance applicable to the extension of the aqueduct ($342,661.19) is contemplated under existing contracts.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., July 7, 1888.

MAJOR: I have the honor to submit the following report of operations for "increasing the water supply of the city of Washington, D. C.," during the fiscal year ending June 30, 1888.

The project adopted in 1882 for increasing the water supply of the city of Washington consisted in completing the dam across the Maryland Channel of the Potomac River at Great Falls, building a dam across Conn's Island and the Virginia Channel, extending the conduit from the distributing reservoir to a ravine south of the Soldiers' Home, by means of a tunnel, building in this ravine a reservoir of 300,000,000 gallons capacity, and connecting it with the distributing pipes of the city by large iron water mains.

At the close of the last fiscal year the dam at Great Falls had been completed; the water mains had been laid, with the exception of a few lengths at the new gate-house; and the tunnel had been "holed," and 6,110.5 linear feet had been lined with brick and rubble masonry. To complete the reservoir so that water could be introduced required about 50,000 cubic yards of excavation, 12,000 square yards of paving, the construction of a gate-house over the eastern shaft of the tunnel, and the building of a conduit from the gate-house, to cause a circulation of water in the reservoir. A description of the work done will be found fully explained in preceding reports.

During the fiscal year ending June 30th, 1888, the excavation and paving of the reservoir has been completed except in the gate-house recess, and no work can there be undertaken until lining in the heading from the east shaft of the tunnel has been completed, and the cages employed in hoisting material have been removed.

The work of lining the tunnel was continued with a small force until September 30th, when operations were suspended on account of a lack of funds. As the worst rock encountered had been lined, the tunnel was allowed to fill with water, not only from motives of economy, but also to test the strength of the lining already constructed. In the general deficiency bill approved March 30, 1888, Congress appropriated $355,000 to complete the lining of the tunnel, etc., with the proviso that the work should be finished November 1st, 1888. The water was then pumped out and work was resumed, but it was not until the end of May that the building of the masonry arch could be actively commenced.

During the year 3,959.5 linear feet of the tunnel were lined with brick and rubble masonry, of which nearly one-third (1,186 feet) were constructed during the month of June. The total length of the tunnel lined is 10,069.5 feet. There remains to be lined 10,626.8 feet.

The following table shows the location of the various lined sections of the tunnel, the numbers under the heading "class of lining" referring to the cross-sections submitted herewith:

Shaft.	Heading.	Length.	Class of lining.	Sections.	Linear feet.	Number of feet to be lined.
East	West ...	3,317.1	1	318– 746	428	
			1	946.8–1025	78.2	
			2	1025–1145	120	
			1	1145–1197	52	
			2	1197–1475	278	
			1	1475–1912	437	
			2	1912–3317.1	1,405.1	518.8
					2,798.3	
Champlain	East ...	3,348	3	078– 228	150	
			4	228– 866	638	
			2	2968–3348	380	2,180
					1,168	
	West ...	2,062	1	77.4– 666	588.6	
			2	666– 743	77	
			1	743– 766	23	
			2	766– 815	49	
			1	815– 867	52	
			2	867–2062	1 195	77.4
					1,984.6	
Rock Creek	East ...	3,124.5	4	1304–1444	140	
			4	1753–1850	97	
			2	1850–3124.5	1,274.5	1,613
					1,511.5	
	West ...	3,552	4	101– 258	154	
			3	1684.7–2239.3	554.6	
			2	2239.3–2574.8	335.5	
			3	3153–3363.5	210.5	2,297.4
					1,254.6	

Shaft.	Heading.	Length.	Class of lining.	Sections.	Linear feet.	Number of feet to be lined.
Foundry Branch	East	2,875.7	4	096–362	266	2,609.7
	West	2,208	3	879.6–1085	205.4	
			2	1085–1197.6	112.6	
			3	1197.6–1329.6	132	
			2	1780.5–2208	427.5	1,330.5
					877.5	
West	East	209	2	0– 9.8	9.8	
			1	9.8– 56.7	46.9	
			2	56.7– 209	152.3	
					209.0	
Total		20,696.3			10,069.5	10,626.8

NOTE.—Brick-work of four rings was used in west heading, Champlain avenue shaft, between stations 815–846, 867–1050, 1390–1440. A three-ring invert was built from 815–846. About 2,100 feet have been enlarged for lining and 379 feet of side walls constructed.

As will be seen from the above method of lining the tunnel has been materially modified from time to time. The reasons for the change from dry-stone packing to a filling of rubble masonry have been fully explained in preceding reports. In the sections in which the invert is omitted there is no danger of the rock decomposing to an extent sufficient to endanger the stability of the side walls, and the duty of the lining is merely to hold the rock in place. Section 4 is employed in rock considered solid enough to resist the pressure of water, and is introduced as a precautionary measure, to prevent any possibility of the roof caving in.

If the tunnel could readily be emptied from time to time it might have been advisable to have left these sections unlined, but the time necessary to pump out the water and make any repairs will be so long, and the discomfort to the citizens of Washington during that interval so great, that a reasonable expenditure should be made to reduce the chances of accident to a minimum. In this connection the record of the pumping out of the tunnel when work was resumed is submitted. The pumps employed were four Knowles's mining pumps, cylinders 10 inches and 6 inches, length of stroke 12 inches, and one Cameron pump of corresponding size.

Pumping commenced at Rock Creek shaft with two pumps, March 26th. At the east shaft with one pump, March 28th. At Foundry Branch shaft with one pump, March 29th. At Champlain avenue shaft with one pump, April 6th. Foundry Branch shaft was cleared of water April 13th; Rock Creek shaft, April 22d; Champlain avenue, May 3d; east shaft, May 16th. The extra pump at Rock Creek was transferred to the east shaft when the water in the former shaft had been reduced to a depth of six feet. The tunnel filled with water until it flowed out at Rock Creek, in about 1½ months.

The work will be vigorously prosecuted during the next fiscal year, but as it will not be completed on the 1st of November, as directed by act of Congress, it seems proper to explain fully the reasons therefor.

In previous years the course had been adopted of lining those sections of the tunnel in which the rock was bad, with the intention of leaving a large portion unlined, and the lining was therefore very irregularly distributed in the different headings. Thus in the west headings, from Champlain avenue and the east shafts, the work was nearly completed, while in the east heading, from Foundry Branch shaft, no masonry had been laid.

In the bill approved March 30th, 1888, the lining of the entire tunnel is authorized. The time necessary to complete the work now becomes a function of the rate of progress in the longest unlined heading. The operations of breaking down the rock to enlarge the tunnel for lining, and of laying the brick and rubble masonry, can be carried on simultaneously at many points, so that the rate of progress is limited only by the removal of the blasted rock and the introduction of brick and cement. By the substitution of rubble side walls for brick, the work of hauling the material is expedited, as less stone is removed from the tunnel and less brick brought into it. Only a small force, however, can be used in loading the rock in cars, due to the small width of the tunnel, and it is found that, working continuously, the muck can not be removed at a rate of but 20 feet per day when near the shaft. After the tunnel is lined the bottom must be cleaned and the tracks removed, the timbering in the working shafts must be taken out and the shafts filled up. To complete the work in

the time specified is therefore an impossibility. The attention of Congress should be called to this subject, as the proviso would appear to make the expenditure of the funds appropriated unlawful if the work is not completed at the time specified.

Very respectfully, your obedient servant,

C. McD. TOWNSEND,
1st Lieut. of Eng'rs.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A.

[Committee No. 2.]

DISTRICT OF COLUMBIA,
City of Washington, ss:

Personally came before me, a notary public in and for the aforesaid District and city, George Kendall and William Kendall, who, being duly sworn, state upon oath that they reside in the city of Washington, D. C.; that they so resided for the greater portion of the last two years and six months; that by occupation they are bricklayers, and in such capacity have been employed by the subcontractors in the construction and building of the works which are known as the Washington Aqueduct Tunnel. Our last employment commenced in May, and continued up to, on, or about the 12th day of September instant; that in the following of our trade we have had much experience in doing the brick-work in tunnels, and are familiar with the proper construction both as to the stone and brick work. Our opportunity of knowing of the progress and construction of these works have been that of employés daily brought in contact with the work and workmen employed. Our knowledge of the facts as they have existed and do exist is that which would and has come directly under our notice and attention. From our experience in May last up to the present time, we have been impressed that the work on the tunnel was not being performed in accordance with the specifications or contract—wherein the space between the ring-buck and the roof was not being packed with stone solidly embedded in cement, but, on the contrary, in many places stones were being thrown in loosely without any cement being used. In other places no packing whatever was being done in the space between the key of the brick arch and the roof of excavation, all of which was called for in the contract, and without which, in our opinion, a solid, permanent, safe, or durable structure could not be built. These works were continually slighted, and imperfect and faulty construction allowed to pass without being corrected. Complaints were made, but the error was not corrected nor any instructions given to remedy the evil in any particular; that the work on the tunnel has not been performed in a substantial, workmanlike manner. It has been slighted in both labor and construction. In labor, wherein experienced, capable workmen have been discharged and inexperienced, untrained, and unskilled labor has been substituted, all of which was in direct violation of the contract, which calls for skilled labor; that the number of workmen employed could not perform in a workmanlike manner the work turned in without the same being slighted and unsubstantial; in fact, one man was presumed to do the work of three; that the labor is now being performed by workmen who have no practical experience of the manner in which such work should be done; that the quality and quantity of the cement used was not up to the standard which we have seen used in like work which have come within our knowledge as workmen. When a bushel has been used a barrel or more would be required for an honest performance of the contract to make the work durable and substantial. Instances occurred where five barrels would be used and fifteen barrels would be turned in as the amount actually consumed; that the carelessness in the performance of the work can be readily developed upon an investigation.

WILLIAM KENDALL.
GEORGE KENDALL.

Sworn and subscribed to before me this 24th day of Sept., 1888.

G. W. BALLOCH.
Notary Public.

[Committee No. 3.]

DISTRICT OF COLUMBIA,
City of Washington:

Personally came before me, a notary public in and for the aforesaid district and city, Thomas Lucas, who, being duly sworn, states upon oath that he resides in the city of Washington, D. C., 2151 Penna. avenue. That I have resided in this city for 62 years; that my occupation is an inspector of masonry; that since the 15th day of May last I have been employed as an inspector on the works known as the Washington Aqueduct tunnel. I was in the employ of the Government, and my duties

were to inspect the work to see that it was properly done, and to report to the chief inspector, who made report in regard to the progress of the work to the engineer in charge. Complaints were made that the amount of work done was not enough for the number of men employed; therefore they were working too many men. In the month of June a night inspector was employed to supervise the packing, keying over the work which had been done during the day. Finding that too much work was done in a single night than could be properly done, I required the cement mixer to drop a brick for every barrel of cement which was sent into the tunnel. I found six bricks next morning, which represented forty yards of masonry. The work represented a finish at the end of the arch. If this work had been properly performed forty barrels would have been used. I then complained publicly in the tunnel and to my superior officer, and was reprimanded. I explained to him fully as to the manner in which this work was done and how I knew it. This character of work was being done as long as the night inspector was employed on Champlain avenue and until he left for the Howard University section. I made several and further complaints, seeing the same kind and character of work being continually performed. The laborers were inexperienced, untrained, and unskilled, not capable or competent to perform the work required of them. Skilled or competent laborers was discharged and green or fresh hands were substituted in their places. I showed laborers how the work should be performed, but they seemed to have their instructions, and my suggestions were not followed; that my attention was called at other times to work which had been improperly done on other sections of the work. I know the fact of this faulty and imperfect work being done; that the same had been complained of, and the same not corrected; that from my knowledge of the work I would state that this faulty and imperfect . . . . was brought many times to the knowledge of the sub-contractors and inspectors, but no change in the manner or character of the work was insisted on or any instructions given, to my knowledge, that the work should be done in a more workmanlike manner; that the carelessness in the performance of the work can be readily developed upon an investigation.

THOMAS LUCAS.

Sworn and subscribed to before me this 24th day of Sept., 1888.

G. W. BALLOCH,
Notary Public.

[Committee No. 4.]

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., October 15, 1888.

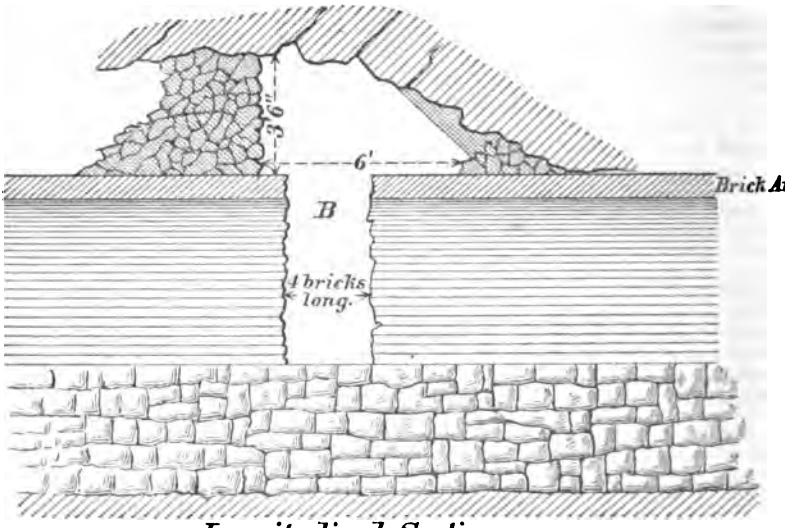
The CHIEF OF ENGINEERS, U. S. ARMY,
Washington, D. C.:

GENERAL: I have the honor to submit the following report in relation to charges contained in affidavits made by Messrs. George and William Kendall and Thomas Lucas as to character of work in lining of the Washington Aqueduct tunnel, which affidavits were forwarded to the honorable Secretary of War on the 25th ultimo.

These affidavits charge, in effect, that the rubble packing, which is designed to solidly fill all the space between the brick arch and the surrounding rock through which the tunnel was excavated, has not been done as required by the specifications; that in many places the stone is thrown in loosely without being laid in mortar, while in other places no packing whatever has been done in the space between the key of the brick arch and the roof of the excavation; that experienced workmen have been discharged and unskilled labor substituted; that the quality and quantity of cement was not up to standard; that complaints were made in relation to these matters, but that no notice was taken of them.

Similar charges having appeared in the public press, I had already directed that a series of borings should be made through the arch in order to ascertain where such defective work might be located, the parties making the charges refusing to indicate such localities. These preliminary borings were made under the personal directions of Lieut. Townsend from September 26 to 30, and resulted in developing several places where faulty work undoubtedly existed, but did not indicate its extent. I then visited the tunnel October 1, in company with Lieut. Townsend, and caused the brick facing of the lining to be cut out bodily, so as to see exactly what was behind it. The first point so opened was in the east Champlain avenue heading, and a condition of affairs substantially as is indicated on the sketch (Fig. 1) herewith was shown up. The brick arch was cut out at (B) throughout its whole perimeter; a solid rubble backing was found up to the keying courses, but over the latter was a void about 6 feet long and varying in height from 3½ feet to a few inches, the surface of rock excavation coming down quite near to the back of the brick arch at the

eastern end of the hole. Cutting out the rubble backing through to the rock showed solid work from the key down to the springing lines of the arch, the stone being well imbeded in an ample quantity of mortar of good quality. The portion of work where this void was found was within the limits that had been inspected by Thomas Lucas, whose affidavit concerning defective work is one of those upon which I am required to report. The next opening was made about 50 feet to the eastward of that above



Longitudinal Section.

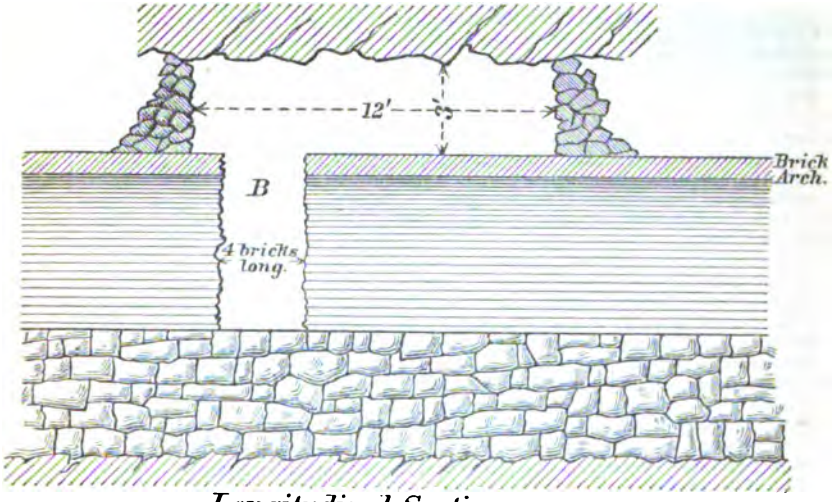
Cross Section.

FIG. 1.

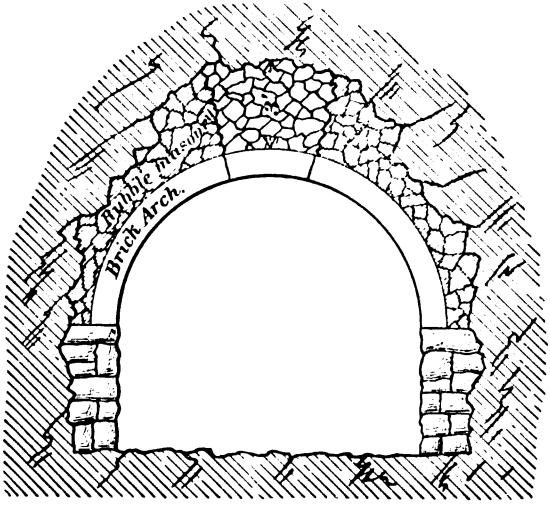
described, and showed a clear opening over the keying courses about 12 feet long, limited at each end by a good masonry wall. See sketch (Fig. 2). The rubble backing from the keying courses down to springing lines was good rubble work, such as found at the first place herein described. This second cavity was in work inspected by Thomas O'Brien, and borings made on other portions of the work that had been

inspected by him lead to the conclusion that a large portion of it is similar to that described above. His inspection was, as a rule, confined to the work of "keying."

While these sections were being opened up holes were drilled through the brick-work in a dozen or fifteen places to test the character of backing between the key and springing line; the result was to indicate solid rock, as a rule, such as was shown at the two places upon which detailed report is made above.



Longitudinal Section.



Cross Section.

FIG. 2.

Similar investigation was continued on the 2nd, 3d, 4th, and 8th, in the progress of which four holes over the key, similar to those described above, were opened up, but neither was of considerable extent either as to height or length. The charge that the stone packing was not solidly "imbedded in mortar" was found to be true in some parts of the tunnel, and especially in the west heading from Rock Creek shaft, but it was not such as to justify a decision that the inspector who had overseen it had been criminally involved, as would appear to be the case on O'Brien's work.

The result of the examination confirms the charge that defective work, of the nature indicated, does exist, but the extent of such defective work was not ascertained,

and is not yet known. I would add, however, that so far as the examination extended there is no reason to anticipate that the bad work is so extensive as to cause any delay in completing the whole, or add anything to its cost to the Government. The brick masonry was in every case found to be good, and the quality of mortar proved to be all that was required, notwithstanding the statement that the cement used was not up to standard in quality or sufficient in quantity. The cement has been closely watched and tested, and such as was found unsuitable has been condemned and sent from the work.

Referring to the question of labor employed, whether skilled or unskilled, I can only say that it was such as could, and did, do first-class work in part, and in other parts very defective, or even fraudulent, work. It is not at all unlikely that the question of "union" or "non-union" men is involved in this consideration. Bad work has been detected during its progress in several instances, and the parties participating in it have in each case been discharged; in two cases the inspectors were discharged for having failed to detect bad work, though in neither of these cases was the inspector believed to have been dishonest, but physically unequal to keeping up a proper supervision of the work.

In relation to the statement that complaint had been made as to the character of work, I would observe that neither affiant indicates clearly to whom such complaint was made; none was ever made to Lieutenant Townsend (who was well known to both parties to be the officer in immediate charge of the work), except in cases where he had previously detected the faulty work and taken proper action in the matter; no new points of defective work were in any case indicated to him by either of the affiants. In no case was any representation, or suggestion, of defective work made to myself by any inspector or workman, and the supervising inspectors deny that any defect was ever called to their attention that was not promptly corrected. In respect to all this character of allegation, however, I would state that testimony on oath only could be of any considerable weight, and such testimony it was impossible for me to elicit; therefore it seemed that it would be useless for me to attempt to arrive at anything conclusive in that direction, and also unnecessary in view of the fact that Congress had determined upon an exhaustive examination by a special committee, with powers to act in such a way as to call out all the facts in the case.

The statement that inspectors have reported more cement used than actually went into the work may be true, but I have been unable to determine whether the reports have been in fact so falsified. It is highly probable, however, that where the inspection was fraudulent the reports were likewise so.

I would state in conclusion that in view of the investigation ordered by Congress, and of the probable suspension of work on the tunnel at the close of the current month, I have not taken any steps toward repairing the defective work, nor to continue the examination, beyond that requisite to forming an opinion as to the nature of such defects. If, however, the appointment of an investigating committee is much longer deferred, it is my purpose to resume our examination, with a view to determining the extent as well as the nature of the defective work.

A copy of report made to me on the 11th instant by Lieutenant Townsend, on the results of his inspection of the tunnel lining, is transmitted herewith.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 5.]

List of employés who have been employed on the Washington Aqueduct tunnel.

ASSISTANT ENGINEERS.

S. B. Morrill, Jan. to M'ch, May, July to Sept., '84, 7 months, at $125	$875.00
John A. Partridge, Feb., Apr., June, Aug., Oct., '84, 5 months, at $200	1,000.00
B. D. Carpenter, M'ch, '84, 11 days, at $5	55.00
George H. Coryell, Oct., '84, $\frac{13}{30}$ month, at $125	79.17
George H. Coryell, Nov. and Dec., '84, 2 months, at $150	300.00
George H. Coryell, Jan., '85, 1 month at $175	175.00
George H. Coryell, Feb., 85, to Feb., '88, 36½ months, at $200	7,300.00
R. C. Smead, Dec., '86, to Feb., '87, 2½ months, at $150	375.00
B. N. Bailey, M'ch '88, to Sept., '88, 7 months, at $175	1,225.00

LEVELERS.

J. A. McNicol, Feb. and M'ch, '83, 2 months, at $116.66	233.32
S. B. Morrill, July to Nov., '83, 4$\frac{3}{30}$ months, at $100	410.00

INSPECTORS.

C. B. Tarbell, Jan., '84, to Jan., '86, Aug., '86, to May, '87, 33 1/3 months, at $75	$2,510.00
G. W. S. White, Jan. to May, '84, 4 1/2 months, at $75	337.50
John L. Bronizer, Feb. to Apr., '84, 2 9/30 months, at $75	172.50
H. M. Woodward, June, 1884, to Jan., 1886; Dec., 1886, to Feb., 1887, 22 1/2 months,, at $75	1,687.50
Thomas Lucas, Nov., 1884, to May, 1885; August, 1885, 6 6/30 months, at $75.	462.50
Henry C. Chadwell, Dec., '84, to June, '85, 6 7/30 months, at $75	505.00
Samuel A. Harper, July, '85, to Jan., '86, Oct., '86, 7 1/2 months, at $75	562.50
E. H. Kirlin, Nov., '86, to Sept., '88, 22 18/30 months, at $175	3,943.33

SUB-INSPECTORS.

Frank C. Hutton, Mch. and Apr., '85, 2 months, at $75	150.00
Lorenzo A. Lucas, Mch. to July, '85, 4 18/30 months, at $75	347.50
Samuel A. Harper, Nov., '85, to Sept., '87, 11 months, at $75	825.00
Thomas Lucas, Nov., '86, to Sept., '87, May to Aug., '88, 12 6/30 months, at $75.	912.50
John W. Beale, Jan., '87, 1/30 month, at $60	38.00
Samuel E. Boyce, Feb., '87, to Sept., '87, 7 7/30 months, at $75	577.50
James Lanigan, Feb., '87, to Sept., '87, 7 9/30 months, at $75	547.50
Jacob B. Masters, Feb., '87, to Sept., '87, June, '88, 7 1/2 months, at $75	562.50
Nicholas Harper, June to Sept., '87, 3 15/30 months, at $75	287.50
Martin McNamara, May to Sept., '88, 4 7/30 months, at $75	335.00
Oscar H. Briggs, May, '88, 9/30 month, at $75	22.50
" " " June to Sept., '88, 4 months, at $90	360.00
Thomas O'Brien, June to Aug., '88, 2 7/30 months, at $75	210.00
George T. Woodward, jr., June to Sept., '88, 2 15/30 months, at $75	165.00
" " " " August and Sept., '88, 7/30 month, at $45	40.50
John P. Ronzee, June to Sept., '88, 3 3/30 months, at $75	232.50
Charles E. Thomas, July to Sept., '88, 2 15/30 months, at $75	212.50
George W. Perkins, July, '88, 15/30 month, at $75	45.00
Edmond E. Fisher, July to Sept., 1888, 2 9/30 months, at $75	152.50
John H. Flinn, Aug. and Sept., '88, 1 1/30 months, at $45	66.00
Thomas Muntz, Aug. and Sept., '88, 1 1/30 months, at $45	61.50

RECORDER.

Samuel Grigg, Sept. '84, 9/30 month, at $75	22.50

RODMEN.

John Nelson, Feb. '83, 9 days, at $2.50	22.50
Hominghan Gordon, Feb. and Mar., '83, 33 1/3 days, at $2.50	83.75
John F. Alexander, July to Sept., '83, 57 days, at $2.50	142.50
" " " Oct. and Nov., '83, 2 months, at $65	130.00
Joseph G. Holcombe, Nov. and Dec., '84, 2 months, at $50	100.00
" " " Jan., '85 to Jan., '86, Aug. to Oct., '86, 14 13/30 months, at $75	1,107.50

CHAINMEN.

W. F. Hill, Feb. and March, '83, 14 days, at $2	28.00
Frank B. Winters, July to Oct., '82, 43 days, at $1.50	64.50
Frank O'Moira, July and Aug., '83, 29 days, at $1.50	43.50
G. W. S. White, Oct. and Nov. '83, 1 26/30 months, at $55	102.67
John E. Anderson, Feb. to Oct., '84, 8 23/30 months, at $40	350.67
C. H. H. Thomas, Feb., '84, 13/30 month, at $40	25.33
Patrick McCormick, March and Apr., '84, 1 14/30 months, at $40	59.33
William Schafer, Nov. and Dec., '84, 2 months at $30	60.00
" " Jan. '85 to Jan. '86, Aug. '86 to Nov. '87, 28 8/30 months, at $35	989.33

AXEMEN.

H. J. McGinness, Sept. and Oct. '83, 9 days, at $1.50	13.50
Walter S. Wall, Sept. '83, 4 days, at $1.50	6.00
William Schaefer, Jan. to May, '84, 5 months, at $25	125.00
" " June to Oct., '84, 5 months, at $30	150.00
Peter Smith, Oct., '87, 16 days, at $1.50	24.00

CARPENTER.

Walter M. Pumphrey, Aug., '84, 12 days, at $3	$36.00

LABORER.

William Shaefer, Oct. and Nov., '83, 46 days, at 50c	23.00
Total	32,068.90

Office Washington Aqueduct, September 30, 1888.
The foregoing list is correct as shown by the office records.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 6.]

PROPOSAL.

NEW YORK CITY, *Oct. 4th*, 1883.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

SIR: In accordance with your advertisement of August 29, 1883, inviting proposals for construction of tunnel for increasing the water supply of Washington, D. C., and subject to all the conditions and requirements thereof, and of your specifications of the same date, copies of both of which are hereto attached, and, so far as they relate to this proposal, are made a part of it, we propose to furnish the material and do the work at the following prices, viz:

Will do all excavation in tunnel at ten (10) dollars and —— (—) cents per cubic yard. Will do all earth excavation in shafts at four (4) dollars and —— (—) cents per cubic yard. Will do all rock excavation in shafts at fifteen (15) dollars and —— (—) cents per cubic yard. Will furnish material for and lay brick masonry in tunnel at twelve (12) dollars and — cents per cubic yard.

Will furnish material for and place concrete masonry in tunnel at five (5) dollars and fifty (50) cents per cubic yard.

Will furnish material for and place dry stone packing in tunnel at two (2) dollars and fifty (50) cents per cubic yard.

Will furnish material for and lay brick masonry in shafts at twelve (12) dollars and — cents per cubic yard.*

Will furnish material for and place concrete masonry in shafts at five (5) dollars and fifty (50) cents per cublic yard.

Will furnish material for and place dry stone packing in shafts at two (2) dollars and fifty (50) cents per cubic yard.

Will furnish material for and build air shafts complete at five (5) dollars and — cents per lineal foot.

We make this proposal with a full knowledge of the kind, quantity, and quality of the materials and work required, and, if it is accepted, will, after receiving written notice of such acceptance, enter into contract within ten days, with good and sufficient sureties for the faithful performance thereof, and will commence active operations within ten days after the contracts are signed.

[Signature.] DOWLING, KENNEDY & CO.,
[Address.] Town of New York, 61 Broadway,
County of New York, State of N. Y.

In case of a firm, add names of partners: William P. Kennedy, Michael Dowling, J. Dwight Ripley.

(Signed in triplicate.)

*NOTE.—Price for brick masonry in shafts is twelve (12) dollars per cubic yard.

DOWLING, KENNEDY & CO.

Bidder's bond.

Know all men by these presents, that we, William P. Kennedy, Michael Dowling, and J. Dwight Ripley, of New York, as principals, and Sidney Dillon, of New York, and James N. Smith, of Brooklyn, as sureties, are held and bound unto the United States of America, in the penal sum of seventy-five thousand dollars ($75,000), to the payment of which sum, well and truly to be made, we do bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents.

Given under our hands and seals this twenty-eighth day of September, 1883.

The condition of this obligation is such, that whereas the above bounden Wm. P. Kennedy, Michael Dowling, and J. Dwight Ripley, in response to a public advertisement and notice, dated August 29, 1883, and given and published by Major G. J. Lydecker, Corps of Engineers, United States Army, have made and presented to Major G. J. Lydecker, Corps of Engineers, United States Army, a formal proposal, in writing, whereby they have proposed and agreeed to enter into a contract with Major G. J. Lydecker, Corps of Engineers, United States Army, for construction of tunnel for increasing the water supply of Washington, D. C., according to the terms and conditions set forth in said advertisement and notice.

Now, therefore, if the said Wm. P. Kennedy, Michael Dowling, and J. Dwight Ripley shall not withdraw their said proposal within sixty days from the date of opening the proposals, and shall within ten days from the date on which they may be notified that the said proposal has been accepted, and the said contract awarded to them (provide such award be made within the sixty days above mentioned), duly and formally enter into such contract agreeably to the terms of their said proposal, and into such bond for its due performance as shall be required of them, or if their said proposal shall not be accepted and such contract not be awarded them, then this obligation shall be void, otherwise, that is to say, if either of them shall withdraw their proposal within said sixty days, or fail to enter within said ten days into such contract if awarded them and into such bond, to remain in full force, effect, and virtue.

Witnesses:

S. H. CHITTENDEN.	WILLIAM P. KENNEDY.	[SEAL.]
S. H. CHITTENDEN.	MICHAEL DOWLING.	[SEAL.]
S. H. CHITTENDEN.	J. DWIGHT RIPLEY.	[SEAL.]
S. H. CHITTENDEN.	SIDNEY DILLON.	[SEAL.]
S. H. CHITTENDEN.	JAMES N. SMITH.	[SEAL.]

(Executed in triplicate.)

Justification of the sureties.

STATE OF NEW YORK,
County of New York, ss:

I, Sidney Dillon, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of seventy-five thousand dollars ($75,000) over and above all my debts and liabilities.

(Signature of surety) , SIDNEY DILLON.

Before me,
[SEAL.]

EDWARD CANFIELD,
Notary Public N. Y. C. and Co.

STATE OF NEW YORK,
County of New York, ss:

I, James N. Smith, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of seventy-five thousand dollars ($75,000) over and above all my debts and liabilities.

(Signature of surety) JAMES N. SMITH.

Before me,
[SEAL.]

EDWARD CANFIELD,
Notary Public N. Y. C. and Co.

Certificate.

I, Sam F. Miller, do hereby certify that Sidney Dillon and James N. Smith, the sureties above named, are personally known to me, and that, to the best of my knowledge and belief, each is pecuniarily worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

[SEAL.]

SAM F. MILLER,
Associate Justice U. S. Supreme Court.

[Committee No. 7.]

Supplemental articles of agreement entered into this 18th day of October, eighteen hundred and eighty-six (1886), between Major G. J. Lydecker, Corps of Engineers, U. S. Army, of the first part, and Clinton Beckwith and John V. Quackenbush, partners, doing business under the firm name of Beckwith & Quackenbush, of Mohawk, of the county of Herkimer, State of New York, of the second part.

Whereas, on the 29th day of October, eighteen hundred and eighty-three (1883), the parties above mentioned entered into a contract for the construction of a tunnel for increasing the water supply of Washington, D. C., which provided, among other things, for placing dry stone packing in connection with the lining of said tunnel at a stipulated price per cubic yard;

And whereas the Congress of the United States, in appropriating for the completion of the work, in the general deficiency act approved August 4, 1886, instructed the Secretary of War "to submit to the Board of Engineers for fortifications and for river and harbor improvements whether any changes are demanded for reasons of safety or economy in the method of lining said tunnel heretofore adopted and pursued."

And whereas the Board of Engineers aforesaid, in its report dated August 24, 1886, requires the use of "rubble laid in cement mortar or (with) fine concrete packed solidly around larger stone," in lieu of the dry stone packing hereinbefore referred to, thereby making necessary a modification in the original project, such as involves a change by which the cost of the work will be increased therefor, in order to provide for the modification aforesaid in accordance with the provisions of the original contract dated October 29, 1883.

This agreement witnesseth that the said Major G. J. Lydecker, Corps of Engineers, for and in behalf of the United States of America, and the said Beckwith and Quackenbush, for themselves, their heirs, executors, and administrators, have mutually agreed and by these presents do mutually covenant and agree to and with each other as follows:

That the said party of the second part, in consideration of the extension of the original contract to include the work of lining that may be done under the appropriation made by the act approved August 4, 1886, hereinbefore referred to, and of payment to be made as hereinafter provided, shall furnish all material for and place rubble laid in cement mortar wherever required in the tunnel, all as directed by and to the entire satisfaction of the party of the first part.

In consideration of the material being furnished and the rubble laid as provided for in the foregoing paragraph, the said party of the first part shall pay to the said party of the second part at the rate of four (4) dollars and seventy-five (75) cents per cubic yard; all payments being subject to the conditions named in the original contract.

It is expressly understood and agreed that all provisions of the contract entered into on the 29th day of October, 1883, between the parties herein named shall apply to the work and material provided for by these supplemental articles of agreement in so far as the said provisions are deemed applicable by the party of the first part: and that neither these supplemental articles of agreement nor any extension of the original contract whereby it is made applicable to the work on the tunnel provided for by the general deficiency act approved August 4th, 1886, shall obligate the United States to any expenditure in excess of the amount thereby appropriated, after deducting therefrom the sums necessary for meeting outstanding liabilities for work done up to the date at which that appropriation became available, and for defraying the necessary expenses of engineering, superintendence, and contingencies during the progress of the work.

It is further understood that this agreement is to become operative only when approved by the Chief of Engineers and the Secretary of War, and if not so approved it is to be void and of no effect whatever.

In witness whereof the undersigned have hereunto placed their hands and seals the date first hereinbefore written.

G. J. LYDECKER, [SEAL.]
Major of Engineers, U. S. A.
BECKWITH & QUACKENBUSH. [SEAL.]

Witnesses:
SIMON NEWTON.
JOHN M. LACKEY.

(Executed in quintuplicate.)

Approved, October 19, 1886.

J. C. DUANE,
Brig. Gen., Chief of Engineers.

WAR DEPARTMENT,
October 26, 1886.

Approved:

WM. C. ENDICOTT,
Secretary of War.

[Committee No. 8.]

Supplemental articles of agreement entered into this 5th day of December, eighteen hundred and eighty-seven (1887), between Major G. J. Lydecker, Corps of Engineers, U. S. Army, of the first part, and Clinton Beckwith and John V. Quackenbush, partners, doing business under the firm name of Beckwith & Quackenbush, of Mohawk, of the county of Herkimer, State of New York, of the second part. These articles, now herein named, being in furtherance of and supplementary to certain articles of agreement entered into by the parties aforesaid, relating to the construction of a tunnel for increasing the water supply of Washington, D. C., on the 29th day of October, 1883, and to certain supplemental articles of agreement concerning the same and between the same parties, entered into on the 18th day of October, 1886.

Whereas by reason of the exhaustion of appropriations heretofore made for the conduct of the work in question, it has become necessary to suspend active operations thereon under the original and supplemental articles hereinbefore referred to, and to the advantage of both parties therein concerned to make provisions for the protection of their mutual interests during the period of such suspension, which must endure until a further appropriation by the Congress of the U. S. makes a resumption of the work possible: Therefore,

This agreement witnesseth, that the said Major G. J. Lydecker, Corps of Engineers, for and in behalf of the United States of America, and the said Beckwith & Quackenbush, for themselves, their heirs, executors, and administrators, have mutually agreed, and by these presents do mutually covenant and agree, to and with each other as follows:

First. That in consideration of the work already done to the satisfaction of the party of the first part, and of the further consideration that the entire work in contemplation cannot be completed under contract in which the parties of the second part are now concerned, the party of the first part shall surrender and pay to the parties of the second part the sum of seventy-eight thousand two hundred and seventy-nine dollars and fifty-one cents ($78,279.51), such sum being eighty-five (85) per cent. of the percentage heretofore retained and withheld from the parties of the second part, as a guarantee for the faithful performance of their work as provided in the original articles of agreement.

Second. That the parties of the second part may defer the removal of machinery, rubbish, and refuse material from the site of the work, as provided in the original specifications relating thereto, until required to do so by the party of the first part, after an appropriation for the resumption of operations shall have been made by Congress; and when such removal shall have been effected to the satisfaction of the party of the first part, final payment of all sums justly due to the parties of the second part will be completed; but if such removal shall not have been effected within thirty (30) days after being ordered, the balance of all retained percentages or other moneys due the parties of the second part shall be forfeited to the United States; provided the order for such removal shall not be given within five (5) days after the award of a new contract for continuing work on the tunnel. And provided further, that no such order of removal will be given at that time (1st) if the parties of the second part remain as contractors on the work, to complete it, or (2nd) if within the five (5) days aforesaid they arrange with their successors on the work for the transfer to such successors of all responsibility in relation to such removal, in a manner and under conditions satisfactory in all respects to the party of the first part; whereupon, in either of these two cases, final settlement on account of contracts now existing will be made in such manner as may then be found to be just and proper.

Third. That the pumping machinery at Foundry Branch and Rock Creek shafts shall be kept in proper working order for service at all times by the parties of the second part, so that it may be at any time put into active operation on the orders of the party of the first part; and to that end there shall be in daily service on the work one competent engineer (who shall also be a machinist), whose duty it shall be to care for such pumping machinery, and who shall receive as compensation for such service from the party of the first part the sum of sixty dollars ($60) for each calendar month, to date from the day on which these articles of agreement may go into effect as hereinafter provided.

Fourth. That the party of the first part, shall, at his option, put into active service the pumping machinery at both or either of the two shafts named in the foregoing paragraph, at any time during the suspension of work hereinbefore referred to, paying to the parties of the second part the sum of three dollars ($3) for each day of twenty-four (24) hours that each set of pumping machinery shall be in active use. It being understood that the party of the first part shall control, and pay for all necessary operating expenses in connection with such active pumping operations.

It is understood and agreed that nothing herein contained shall be construed to release from, or add to, any obligation, liability, right, or duty devolving on either party

uuder the operations of the two several articles of agreement to which the
are supplemental.

It is further understood that these supplemental articles of agreement are
operative only when approved by the Chief of Engineers and the Secretar
and if not so approved to be void and of no effect whatever.

In witness whereof the undersigned have hereunto placed their hands an
date first hereinbefore written.

G. J. LYDECKER, [SE
Maj. Engr.,
BECKWITH & QUACKENBUSH. [SE

Witnesses:
SIMON NEWTON.
JOHN M. LASKEY.

(Executed in quintuplicate.)

OFFICE OF CHIEF OF ENGINEERS, U. S. AR
Dec.

Approved

CHAS. W. RAYMO
Acting Chief of E

[2d indorsement.]

WAR DEPARTMENT, *December*

Approved.

R. MACFE
Acting Secretary

[Committee No 9.]

PROPOSAL.

MOHAWK, N. Y., *October* 1

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

SIR: In accordance with your advertisement of August 29, 1883, inviting
for construction of tunnel for increasing the water supply of Washington,
subject to all the conditions and requirements thereof, and of your specifi
the same date, copies of both of which are hereto attached, and, so far as
to this proposal, are made a part of it, we propose to furnish the material
work at the following prices, viz:

Will do all excavation in tunnel at eight ($8.00) dollars and —— (—) cent
yard.

Will do all earth excavation in shafts at six ($6.00) dollars and ——(—
cubic yard.

Will do all rock excavation in shafts at ten ($10.00) dollars and —— (—)
cubic yard.

Will furnish material for and lay brick masonary in tunnel at fourteen ($
lars and —— (—) cents per cubic yard.

Will furnish material for and place concrete masonry in tunnel at five (
lars and —— cents per cubic yard.

Will furnish material for and place dry-stone packing in tunnel at two
lars and fifty (50) cents per cubic yard.

Will furnish material for and lay brick masonry in shafts at eighteen ($1
and —— cents per cubic yard.

Will furnish material for and place concrete masonry in shafts at five ($5.
and —— cents per cubic yard.

Will furnish material for and place dry-stone packing in shafts at two ($
and fifty (50) cents per cubic yard.

Will furnish material for and build air-shafts complete at fifteen ($15) d
—— cents per lineal foot.

We make this proposal with a full knowledge of the kind, quantity, and
the materials and work required, and if it is accepted will, after receivin
notice of such acceptance, enter into contract within ten days, with good

cient sureties for the faithful performance thereof, and will commence active operations within ten days after the contracts are signed.

(Signature.) BECKWITH AND QUACKENBUSH,
(Address.) Town of Mohawk, county of Herkimer, State of New York.

In case of firm, add names of partners: Clinton Beckwith, John V. Quackenbush.
(Signed in triplicate.)

Bidder's bond.

Know all men by these presents, that we, Clinton Beckwith and John V. Quackenbush, of Mohawk, Herkimer Co., N. Y., as principals, and Henry D. Alexander, of Mohawk, Herkimer Co., N. Y., and Floyd C. Shepard, of Ilion, Herkimer Co., N. Y., as sureties, are held and bound unto the United States of America, in the penal sum of seventy-five thousand dollars ($75,000), to the payment of which sum, well and truly to be made, we do bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents.

Given under our hand and seals this first day of October, 1883.

The condition of this obligation is such that, whereas, the above bounden Clinton Beckwith and John V. Quackenbush, of Mohawk, Herkimer Co., N. Y., in response to a public advertisement and notice, dated August 29, 1883, and given and published by Major G. J. Lydecker, Corps of Engineers, United States Army, have made and presented to Major G. J. Lydecker, Corps of Engineers, United States Army, a formal proposal, in writing, whereby they have proposed and agreed to enter into a contract with Major G. J. Lydecker, Corps of Engineers, United States Army, for construction of tunnel for increasing the water supply of Washington, D. C., according to the terms and conditions set forth in said advertisement and notice.

Now, therefore, if the said Clinton Beckwith and John V. Quackenbush shall not withdraw their said proposal within sixty days from the date of opening the proposals, and shall within ten days from the date on which they may be notified that their said proposal has been accepted, and the said contract awarded to them (provide such award be made within the sixty days above mentioned), duly and formally enter into such contract agreeably to the terms of their said proposal, and into such bond for its due performance as shall be required of them, or if their said proposal shall not be accepted and such contract not be awarded them, then this obligation shall be void; otherwise, that is to say, if either them shall withdraw their proposal within said sixty days, or fail to enter within said ten days into such contract if awarded them and into such bond, to remain in full force, effect, and virtue.

Witnesses:

WILLIAM H. BRIGHT.	CLINTON BECKWITH.	[SEAL.]
WILLIAM H. BRIGHT.	JOHN V. QUACKENBUSH.	[SEAL.]
WILLIAM H. BRIGHT.	HENRY D. ALEXANDER.	[SEAL.]
WILLIAM H. BRIGHT.	FLOYD C. SHEPARD.	[SEAL.]

(Executed in triplicate.)

Justification of the sureties.

STATE OF NEW YORK,
County of Oneida, ss:

I, Floyd C. Shepard, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of thirty-five thousand dollars ($35,000.00) over and above all my debts and liabilities.

FLOYD C. SHEPARD. [SEAL.]

Before me—

WILLIAM H. BRIGHT,
U. S. Circuit Court Commissioner, Northern District of New York.

STATE OF NEW YORK,
County of Oneida, ss:

I, Henry D. Alexander, one of the sureties named in the within bond, do swea that I am pecuniarily worth the sum of forty thousand dollars ($40,000.00) over a above all my debts and liabilities.

HENRY D. ALEXANDER. [SEAL.]

Before me—

WILLIAM H. BRIGHT,
U. S. Circuit Court Commissioner, Northern District New York.

Certificate.

I, William H. Bright, do hereby certify that Floyd E. Shepard and
exander, the sureties above named, are personally known to me, an
best of my knowledge and belief, each is pecuniarily worth, over and
debts and liabilities, the sum stated in the accompanying affidavit subs
WILLIAM H.
U. S. Circuit Court Commissioner, Northern District o

[Committee No. 10.]

PROPOSAL.

WASHINGTON, D. C.,

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C:

SIR: In accordance with your advertisement of August 29, 1883, invi
for construction of tunnel for increasing the water supply of Washingt
subject to all the conditions and requirements thereof, and of your sp
the same date, copies of both of which are hereto attached, and, so far
to this proposal, are made a part of it, I propose to furnish the materi
work at the following prices, viz:

Will do all excavation in tunnel at eleven (11) dollars and twenty-f
per cubic yard.

Will do all earth excavation in shafts at seven (7) dollars per cubic y

Will do all rock excavation in shafts at seventeen (17) dollars per cu

Will furnish material for and lay brick masonry in tunnel at fiftee
per cubic yard.

Will furnish material for and place concrete masonry in tunnel at te
per cubic yard.

Will furnish material for and place dry stone packing in tunnel at t
per cubic yard.

Will furnish material for and lay brick masonry in shafts at fifteen (
cubic yard.

Will furnish material for and place concrete masonry in shafts at te
per cubic yard.

Will furnish material for and place dry stone packing in shafts at t
per cubic yard.

Will furnish material for and build air shafts complete at twenty (
lineal foot.

I make this proposal with a full knowledge of the kind, quantity, a
the materials and work required, and, if it is accepted, will, after rece
notice of such acceptance, enter into contract within ten days with g
cient sureties for the faithful performance thereof, and will commence
tions with ten days after the contracts are signed.

[Signature] JAMES ARCHBA
[Address] Town of Sc
County of Lac
Sta

In case of firm add names of partners.
(Signed in triplicate.)

Bidder's bond.

Know all men by these presents, that we, James Archbald, of Scranto
cipal, and John Joseph Albright, of Buffalo, N. Y., and Amzi L. Barbe
ton, D. C., as sureties, are held and bound unto the United States of A
penal sum of seventy-five thousand dollars ($75,000), to the payment
well and truly to be made, we do bind ourselves, our heirs, executors, a
tors, jointly and severally, firmly by these presents.

Given under our hands and seals this first day of October, 1883.

The condition of this obligation is such that whereas the above bo
Archbald, in response to a public advertisement and notice, dated Au
and given and published by Major G. J. Lydecker, Corps of Engineers,

Army, ha— made and presented to Major G. J. Lydecker, Corps of Engineers, United States Army, a formal proposal in writing, whereby he ha– proposed and agreed to enter into a contract with Major G. J. Lydecker, Corps of Engineers, United States Army, for construction of tunnel for increasing the water supply of Washington, D. C., according to the terms and conditions set forth in said advertisement and notice:

Now, therefore, if the said James Archbald shall not withdraw his said proposal within sixty days from the date of opening the proposals, and shall within ten days from the date on which he may be notified that his said proposal has been accepted and the said contract awarded to him (provided such award be made within the sixty days above mentioned), duly and formally enter into such contract agreeably to the terms of his said proposal, and into such bond for its due performance as shall be required of him, or if his said proposal shall not be accepted and such contract not be awarded him, then this obligation shall be void; otherwise, that is to say, if either he shall withdraw his proposal within said sixty days or fail to enter within said ten days into such contract if awarded him and into such bond, to remain in full force, effect, and virtue.

JAMES ARCHBALD. [SEAL.]
JOHN JOSEPH ALBRIGHT. [SEAL.]
AMZI L. BARBER. [SEAL.]

Witnesses.
H. C. SHAFER.
E. G. CHURCH, for J. J. A.
JOSEPH PAUL.

(Executed in triplicate.)

Justification of the sureties.

STATE OF NEW YORK,
County of Erie, ss:

I, John Joseph Albright, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of one hundred thousand dollars ($100,000.00) over and above all my debts and liabilities.

JOHN JOSEPH ALBRIGHT.

Sworn before me this 2nd October, 1883.
[SEAL.]

CHARLES B. HILL,
Notary Public.

DISTRICT OF COLUMBIA,
United States of America, ss:

I, Amzi L. Barber, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of one hundred thousand dollars ($100,000.00) over and above all my debts and liabilities.

AMZI L. BARBER.

Sworn before me this 3d day of October, 1883.
[SEAL.]

R. J. MEIGS, *Clerk.*
By J. P. YOUNG, *Ass't Clerk.*

Certificate.

I, R. J. Meigs, do hereby certify that Jno. Joseph Albright and Amzi L. Barber, the sureties above named, are personally known to me, and that, to the best of my knowledge and belief, each is pecuniarily worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

R. J. MEIGS,
Clerk Supreme Court, D. C.

[Committee No. 11.]

PROPOSAL.

WASHINGTON, D. C., *Oct. 5th*, 1883.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

SIR: In accordance with your advertisement of August 29, 1883, inviting proposals for construction of tunnel for increasing the water supply of Washington, D. C., and subject to all the conditions and requirements thereof, and of your specifications of the same date, copies of both of which are hereto attached, and, so far as they relate

o this proposal, are made a part of it. I propose to furnish the material work at the following prices, viz:

Will do all excavation in tunnel at nine (9) dollars and ninety (90) cent yard.

Will do all earth excavation in shafts at ten (10) dollars and —— cents yard.

Will do all rock excavation in shafts at twelve (12) dollars and —— cent yard.

Will furnish material for and lay brick masonry in tunnel at twenty (and —— cents per cubic yard.

Will furnish material for and place concrete masonry in tunnel at four and —— cents per cubic yard.

Will furnish material for and place dry stone packing in tunnel at one and —— cents per cubic yard.

Will furnish material for and lay brick masonry in shafts at fifteen (15) —— cents per cubic yard.

Will furnish material for and place concrete masonry in shafts at four and —— cents per cubic yard.

Will furnish material for and place dry stone packing in shafts at one and —— cents per cubic yard.

Will furnish material for and build air-shafts complete at ten (10) dolla cents per lineal foot.

I make this proposal with a full knowledge of the kind, quantity, and the materials and work required, and, if it is accepted, will, after receivi notice of such acceptance, enter into contract within ten days, with good cient sureties for the faithful performance thereof, and will commence ac tions within ten days after the contracts are signed.

[Signature] HENRY L. CRANFORD,
[Address] Town of Washing
County of District of Columbia, Stat

In case of firm add names of partners.
(Signed in triplicate.)

Bidder's bond.

Know all men by these presents that we, Henry L. Cranford, of Wash C., as principal, and L. S. Filbert, of Philadelphia, Pa., and Lewis Cl Washington, D. C., as sureties, are held and bound unto the United States in the penal sum of seventy-five thousand dollars ($75,000), to the paymen sum, well and truly to be made, we do bind ourselves, our heirs, executo ministrators, jointly and severally, firmly by these presents.

Given under our hands and seals this fifth day of October, 1883.

The condition of this obligation is such that, whereas, the above bounde Cranford in response to a public advertisement and notice, dated August 2 given and published by Major G. J. Lydecker, Corps of Engineers, Un Army, ha- made and presented to Major G. J. Lydecker, Corps of Engine States Army, a formal proposal, in writing, whereby he ha- proposed an enter into a contract with Major G. J. Lydecker, Corps of Engineers, Un Army, for construction of tunnel for increasing the water supply of Was C., according to the terms and conditions set forth in said advertisement

Now, therefore, if the said H. L. Cranford shall not withdraw his sa within sixty days from the date of opening the proposals, and shall with from the date on which he may be notified that the said proposal has bee and the said contract awarded to him (provided such award be made withi days above mentioned), duly and formally enter into such contract agree terms of his said proposal, and into such bond for its due performance as quired of him, or if the said proposal shall not be accepted and such cont awarded to him, then this obligation shall be void, otherwise, that is to s he shall withdraw his proposal within said sixty days, or fail to enter wit days into such contract if awarded him, and into such bond, to remain i effect, and virtue.

HENRY L. CR
L. S. FILBER
LEWIS CLEPH

Witnesses:
JOHN HARTIGAN.
JOHN HARTIGAN.
JOHN HARTIGAN.

(Executed in triplicate.)

Justification of the sureties.

WASHINGTON, D. C.,
County of ———, *ss:*

I, L. S. Filbert, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of seventy-five thousand dollars ($75,000) over and above all my debts and liabilities.

L. S. FILBERT.

Before me,
[SEAL.] N. CALLAN,
Not'y Public.

WASHINGTON, D. C.,
County of ———, *ss:*

I, Lewis Clephane, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of seventy-five thousand dollars ($75,000) over and above all my debts and liabilities.

LEWIS CLEPHANE.

Before me,
[SEAL.] N. CALLAN,
Not'y Public.

Certificate.

I, N. Callan, not'y public, do hereby certify that L. S. Filbert and Lewis Clephane, the sureties above named, are personally known to me, and that, to the best of my knowledge and belief, each is pecuniarily worth over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

N. CALLAN.

[Committee No. 12.]

PROPOSAL.

SYRACUSE, N. Y., *October 2d*, 1883.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

SIR: In accordance with your advertisement of August 29, 1883, inviting proposals for construction of tunnel for increasing the water supply of Washington, D. C., and subject to all the conditions and requirements thereof, and of your specifications of the same date, copies of both of which are hereto attached, and, so far as they relate to this proposal, are made a part of it, we propose to furnish the material and do the work at the following prices, viz:

Will do all excavation in tunnel at ten (10) dollars and fifty (50) cents per cubic yard.

Will do all earth excavation in shafts at fifteen (15) dollars and no (no) cents per cubic yard.

Will do all rock excavation in shafts at fifteen (15) dollars and no (no) cents per cubic yard.

Will furnish material for and lay brick masonry in tunnel at twelve (12) dollars and no (no) cents per cubic yard.

Will furnish material for and place concrete masonry in tunnel at twelve (12) dollars and no (no) cents per cubic yard.

Will furnish material for and place dry stone packing in tunnel at two (2) dollars and fifty (50) cents per cubic yard.

Will furnish material for and lay brick masonry in shafts at twelve (12) dollars and fifty (50) cents per cubic yard.

Will furnish material for and place concrete masonry in shafts at six (6) dollars and fifty (50) cents per cubic yard.

Will furnish material for and place dry stone packing in shafts at two (2) dollars and fifty (50) cents per cubic yard.

Will furnish material for and build air-shafts complete at five (5) dollars and no (no) cents per lineal foot.

We make this proposal with a full knowledge of the kind, quantity, and quality of the materials and work required, and, if it is accepted, will, after receiving written notice of such acceptance, enter into contract within ten days, with good and sufficient sureties for the faithful performance thereof, and will commence active operations within ten days after the contracts are signed.

[Signature] STEPHENS, GERE & CO.,
[Address] City of Syracuse, county of Onondaga, State of New York.

In case of a firm, add names of partners, Clinton Stephens, Robert W. Gere, Charles E. Hubbell.
(Signed in triplicate.)

Bidder's bond.

Know all men by these presents that we, Clinton Stephens, Robt. W. Ger
E. Hubbell, of Syracuse, N. Y., as principal, and R. Nelson Gere, of Syracu
and William T. Hamilton, of Syracuse, N. Y., as sureties, are held and bo
the United States of America, in the penal sum of seventy-five thousan
($75,000), to the payment of which sum, well and truly to be made, we do
selves, our heirs, executors, and administrators, jointly and severally, firml
presents.

Given under our hands and seals this second day of October, 1883.

The condition of this obligation is such that whereas the above bounde
Stephens, Robt. W. Gere, Charles E. Hubbell, in response to a public adve
and notice, dated August 29, 1883, and given and published by Major G. J.
Corps of Engineers, United States Army, have made and presented to M
Lydecker, Corps of Engineers, United States Army, a formal proposal, i
whereby they have proposed and agreed to enter into a contract with M
Lydecker, Corps of Engineers, United States Army, for construction of tun
creasing the water supply of Washington, D. C., according to the terms and c
set forth in said advertisement and notice:

Now, therefore, if the said Clinton Stephens, Robt. W. Gere, Charles E.
shall not withdraw their said proposal within sixty days from the date o
the proposals, and shall within ten days from the date on which they may b
that their said proposal has been accepted, and the said contract awarde
(provide such award be made within the sixty days above mentioned),
formally enter into such contract agreeably to the terms of their said pro
into such bond for its due performance as shall be required of them, or if
proposal shall not be accepted and such contract not be awarded them, then
gation shall be void; otherwise, that is to say, if either of them shall withd
proposal within said sixty days, or fail to enter within said ten days into
tract if awarded to them, and into such bond, to remain in full force, e
virtue.

CLINTON STEPHENS.
ROBERT W. GERE.
CHARLES E. HUBBELL.
R. NELSON GERE.
WILLIAM T. HAMILTON.

Witnesses:
E. F. ALLEN.

(Executed in triplicate.)

Justification of the sureties.

STATE OF NEW YORK,
County of Onondaga, ss:

I, R. Nelson Gere, one of the sureties named in the within bond, do swe
am pecuniarily worth the sum of seventy-five thousand dollars ($75,000)
above all my debts and liabilities.

R. NELSON

Subscribed and sworn to before me this 3d day of Oct., 1883.
[SEAL.] JOHN C. KEEF
Notary

STATE OF NEW YORK,
County of Onondaga, ss:

I, William T. Hamilton, one of the sureties named in the within bond,
that I am pecuniarily worth the sum of seventy-five thousand dollars ($75,
and above all my debts and liabilities.

WILLIAM T. HA

Subscribed and sworn to before me this 3d day of Oct., 1883.
[SEAL.] JOHN C. KEEF
Notary

Certificate.

I, A. Judd Northrup, U. S. C. C. Comr., do hereby certify that R. Nelson
William T. Hamilton, the sureties above named, are personally known to
that, to the best of my knowledge and belief, each is pecuniarily worth,
above all his debts and liabilities, the sum stated in the accompanying affid
scribed by him.

[SEAL.] A. JUDD NORTHR
U. S. C. C. Commission., North'n District of Ne

Copy.

[Committee No. 13.]

PROPOSAL.

WASHINGTON, D. C., *October 3rd*, 1883.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.

SIR: In accordance with your advertisement of August 29, 1883, inviting proposals of construction of tunnel for increasing the water supply of Washington, D. C., and subject to all the conditions and requirements thereof, and of your specifications of the same date, copies of both of which are hereto attached, and, so far as they relate to this proposal, are made a part of it, propose to furnish the material and do the work at the following prices, viz:

Will do all excavation in tunnel at seven (7) dollars and seventy-eight (78) cents per cubic yard.

Will do all earth excavation in shafts at five (5) dollars and sixty (60) cents per cubic yard.

Will do all rock excavation in shafts at sixteen (16) dollars and twenty-four (24) cents per cubic yard.

Will furnish material for and lay brick masonry in tunnel at twelve (12) dollars and eighty (80) cents per cubic yard.

Will furnish material for and place concrete masonry in tunnel at eight (8) dollars and fifty-five (55) cents per cubic yard.

Will furnish material for and place dry stone packing in tunnel at one (1) dollar and 0 (0) cents per cubic yard.

Will furnish material for and lay brick masonry in shafts at sixteen (16) dollars and seventy (70) cents per cubic yard.

Will furnish material for and place concrete masonry in shafts at thirteen (13) dollars and seventy-five (75) cents per cubic yard.

Will furnish material for and place dry stone packing in shafts at two (2) dollars and twenty-five (25) cents per cubic yard.

Will furnish material for and build air-shafts complete at two (2) dollars and twenty-five (25) cents per lineal foot.

* * * make this proposal with a full knowledge of the kind, quantity, and quality of the materials and work required, and if it is accepted will, after receiving written notice of such acceptance, enter into contract within ten days, with good and sufficient sureties for the faithful performance thereof, and will commence active operations within ——— days after the contracts are signed.

[Signature] EUGENE ROBINSON,
[Address] Town of city of Detroit, No. 5, Hall Block,
County of Wayne, State of Michigan.

In case of a firm, add name of partners.
(Signed in triplicate.)

Bidder's bond.

Know all men by these presents, that we, Eugene Robinson, of Detroit, Mich., as principal, and Jesse H. Farwell, of Detroit, Mich., and Thomas Adams, of Detroit, Mich., as sureties, are held and bound unto the United States of America in the penal sum of seventy-five thousand dollars ($75,000), to the payment of which sum, well and truly to be made, we do bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents.

Given under our hands and seals this first day of Oct., 1883.

The condition of this obligation is such that, whereas, the above bounden Eugene Robinson, in response to a public advertisement and notice, dated August 29, 1883, and given and published by Major G. J. Lydecker, Corps of Engineers, United States Army, has made and presented to Major G. J. Lydecker, Corps of Engineers, United States Army, a formal proposal, in writing, whereby he has proposed and agreed to enter into a contract with Major G. J. Lydecker, Corps of Engineers, United States Army, for construction of tunnel for increasing the water supply of Washington, D. C., according to the terms and conditions set forth in said advertisement and notice.

Now, therefore, if the said Eugene Robinson shall not withdraw his said proposal within sixty days from the date of opening the proposals, and shall within ten days from the date on which he may be notified that his said proposal has been accepted and the said contract awarded to him (provide such award be made within the sixty days above mentioned), duly and formally enter into such contract agreeably to the

terms of his said proposal and into such bond for its due performance as
quired of him; or if his said proposal be not accepted and such cont
awarded him, then this obligation shall be void, otherwise, that is to say,
shall withdraw his proposal within said sixty days, or fail to enter with
days into such contract, if awarded him, and into such bond, to remain i
effect, and virtue.

EUGENE ROBINSON.
JESSE H. FARWELL.
THOMAS ADAMS.

Witnesses as to Adams & Farwell:
GEORGE FARWELL.
WILLIAM J. NESBITT.

(Executed in triplicate.)

Justification of the sureties.

STATE AND EASTERN DISTRICT OF MICHIGAN,
County of Wayne, ss:

I, Jesse H. Farwell, one of the sureties named in the within bond, do s
am pecuniarily worth the sum of seventy-five thousand dollars ($75,00
above all my debts and liabilities.

JESSE H.

Subscribed and sworn to before me this 1st day of Oct., 1883.
[SEAL.] JNO. GR.
U. S. Circuit Ct. Comm., East. I

STATE AND EASTERN DISTRICT OF MICHIGAN,
County of Wayne, ss:

I, Thomas Adams, one of the sureties named in the within bond, do swe
pecuniarily worth the sum of seventy-five thousand dollars ($75,000) ove
all my debts and liabilities.

THOMA

Subscribed and sworn to before me this 1st day of Oct., 1883.
[SEAL.] JNO. GR.
U. S. Circuit Court Comm'r, East. I

Certificate.

I, Jno. Graves, do hereby certify that Jesse H. Farwell and Thomas
sureties above named, are personally known to me. and that, to the best o
edge and belief, each is pecuniarily worth, over and above all his debts an
the sum stated in the accompanying affidavit subscribed by him.
[SEAL.] JNO. GR.
U. S. Circuit Court Comm'r, East. I

[Committee No. 14.]

PROPOSAL.

WASHINGTON, D. C., *Oct*

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

SIR: In accordance with your advertisement of August 29, 1883, invitin
for construction of tunnel for increasing the water supply of Washington
subject to all the conditions and requirements thereof, and of your specifica
same date, copies of both of which are hereto attached, and, so far as th
this proposal, are made a part of it, we propose to furnish the material
work at the following prices, viz:

Will do all excavation in tunnel at six (6) dollars and seventy-four (74
cubic yard.

Will do all earth excavation in shafts at six (6) dollars and twenty-fiv
per cubic yard.

Will do all rock excavation in shafts at twelve (12) dollars and fort
per cubic yard.

Will furnish material for and lay brick masonry in tunnel at ten (10)
cubic yard.

Will furnish material for and place concrete masonry in tunnel at five (5) dollars per cubic yard.

Will furnish material for and place dry-stone packing in tunnel at two (2) dollars per cubic yard.

Will furnish material for and lay brick masonry in shafts at twelve (12) dollars per cubic yard.

Will furnish material for and place concrete masonry in shafts at five (5) dollars per cubic yard.

Will furnish material for and place dry stone packing in shafts at two (2) dollars per cubic yard.

Will furnish material for and build air-shafts complete at four (4) dollars and seventy-five (75) cents per lineal foot.

We make this proposal with a full knowledge of the kind, quantity, and quality of the materials and work required, and, if it is accepted, will, after receiving written notice of such acceptance, enter into contract within ten days with good and sufficient sureties for the faithful performance thereof, and will commence active operations within ten days after the contracts are signed.

[Signature] J. H. DEWEES & Co.

[Address] Town of Washington, County of D. C., 1701 Boundary st.

In case of firm, add names of partners: J. H. Dewees, Samuel Walton, Reese Evans, A. O. Brumnell.

(Signed in triplicate.)

Bidder's bond.

Know all men by these presents that we, J. G. Dale, Tionesta, Forest Co., Pa., as principal, and W. J. Green, of Washington, D. C., as sureties, are held and bound unto the United States of America in the penal sum of seventy-five thousand dollars ($75,000), to the payment of which sum, well and truly to be made, we do bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents.

Given under our hands and seals this fifth day of Oct., 1883.

The condition of this obligation is such that whereas the above bounden J. G. Dale and W. J. Green, in response to a public advertisement and notice, dated August 29, 1883, and given and published by Major G. J. Lydecker, Corps of Engineers, United States Army, have made and presented to Major G. J. Lydecker, Corps of Engineers, United States Army, a formal proposal, in writing, whereby they have proposed and agreed to enter into a contract with Major G. J. Lydecker, Corps of Engineers, United States Army, for construction of tunnel for increasing the water supply of Washington, D. C., according to the terms and conditions set forth in said advertisement and notice.

Now, therefore, if the said J. G. Dale and W. J. Green shall not withdraw their said proposal within sixty days from the date of opening the proposals, and shall within ten days from the date on which they may be notified that their said proposal has been accepted, and the said contract awarded to them (provided such award be made within the sixty days above mentioned), duly and formally enter into such contract agreeably to the terms of their said proposal, and into such bond for its due performance as shall be required of them, or if their said proposal shall not be accepted and such contract not be awarded them, then this obligation shall be void; otherwise, that is to say, if either of us shall withdraw our proposal within said sixty days, or fail to enter within said ten days into such contract if awarded and into such bond, to remain in full force, effect, and virtue.

J. G. DALE. [SEAL.]
W. J. GREEN. [SEAL.]

Witnesses:
H. L. TODD.
MICHAL L. WOODS.
(Executed in triplicate.)

Justification of the sureties.

STATE OF PENNA.,
County of Forest, ss:

I, J. G. Dale, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of fifty thousand dollars ($50,000) over and above all my debts and liabilities.

——— ———. [SEAL.]

Before me—

W. J. GREEN. [SEAL.]

Washington, D. C., ss:

I, W. J. Green, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of twenty-five thousand dollars ($25,000) over and above all my debts and liabilities.

W. J. GREEN.

Before me—

———— ————.

Certificate.

I, L. E. Johnson, do hereby certify that J. G. Dale and W. J. Green, the sureties above named, are personally known to me, and that, to the best of my knowledge and belief, each is pecuniarily worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

L. E. JOHNSON. [SEAL.]

[Committee No. 15.]

Abstract of proposals received and opened October 5, 1883, *for construction of tunnel for increasing the water supply of Washington, D. C.*

No.	Name and residence.	Excavation in tunnel, 64,000 c. yds.	Earth excavation in shafts, 1,500 c. yds.	Rock excavation in shafts, 1,200 c. yds.	Tunnel lining.		
					Brick masonry, am't unknown, per c. yd.	Concrete masonry, am't unknown per c. yd.	Dry stone packing, am't unknown, per c. yd.
1	J. A. Dewees & Co., Washington, D. C.	$6.74 431,360.00	$6.25 9,375.00	$12.40 14,880.00	$10.00	$5.00	$2.00
2	Eugene Robinson, Detroit, Mich.	7.78 497,920.00	5.60 8,400.00	16.24 19,488.00	12.80	8.55	1.00
3	Beckwith & Quackenbush, Mohawk, N. Y.	8.00 512,000.00	6.00 9,000.00	10.00 12,000.00	14.00	5.00	2.50
4	Dowling, Kennedy & Co., New York, N. Y.	10.00 640,000.00	4.00 6,000.00	15.00 18,000.00	12.00	5.50	2.50
5	Henry D. Cranford, Washington, D. C.	9.90 636,600.00	10.00 15,000.00	12.00 14,400.00	20.00	4.00	1.00
6	Stephens, Gere & Co., Syracuse, N. Y.	10.50 672,000.00	15.00 22,500.00	15.00 18,000.00	12.00	12.00	2.50
7	James Archbald, Scranton, Penn.	11.25 720,000.00	7.00 10,500.00	17.00 20,400.00	15.00	10.00	2.00

No.	Name and residence.	Brick masonry in shafts, 250 c. yds.	Concrete masonry in shafts, 660 c. yds.	Dry stone packing in shafts, 400 c. yds.	Air-shafts complete, 420 lin. ft.	Aggregate cost of items in approximate bill.	Balance of appropriation.	Tunnel lining.*
								C. yds.
1	J. H. Dewees & Co., Washington, D. C.	$12.00 3,000.00	$5.00 3,300.00	$2.00 800.00	$4.75 1,995.00	$464,710.00	$124,824.55	25,240
2	Eugene Robinson, Detroit, Mich.	16.70 4,175.00	13.75 9,075.00	2.25 900.00	2.25 945.00	540,903.00	58,631.55	7,329
3	Beckwith & Quackenbush, Mohawk, N. Y.	18.00 4,500.00	5.00 3,300.00	2.50 1,000.00	15.00 6,300.00	584,100.00	51,434.55	8,455
4	Dowling, Kennedy & Co., New York, N. Y.	12.00 3,000.00	5.50 3,630.00	2.50 1,000.00	5.00 2,100.00	673,730.00	None.....	None.
5	Henry D. Cranford, Washington, D. C.	15.00 3,750.00	4.00 2,640.00	1.00 400.00	10.00 4,200.00	676,990.00	...do.....	...do...
6	Stephens, Gere & Co., Syracuse, N. Y.	12.50 3,125.00	6.50 4,290.00	2.50 1,000.00	5.00 2,100.00	723,015.00	...do.....	...do...
7	James Archbald, Scranton, Penn.	15.00 3,750.00	10.00 6,600.00	2.00 800.00	20.00 8,400.00	770,450.00	...do.....	...do...

* May be placed with balance of appropriation at contractor's rates.

Respectfully submitted.

G. J. LYDECKER,
Major of Engineers, U. S. A.

OFFICE WASHINGTON AQUEDUCT,
Washington, D. C., October 13, 1883.

[Committee No. 16.]

Lydecker, Major J. G., transmits abstract and bids for tunnel construction for increasing water supply of Washington, D. C., and recommending award of contract to Beckwith & Quackenbush for reasons given.

OFFICE OF WASHINGTON AQUEDUCT,
Washington, D. C., October 13, 1883.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A., Washington, D. C.:

GENERAL: I have the honor to transmit herewith abstract of bids for tunnel construction for increasing the water supply of Washington, D. C., received and opened in this office, October 5, 1883, together with one copy of each proposal offered.

In order to determine the lowest bid the following method of computation has been adopted, for the reason that for a portion of the work to be done (tunnel lining) no approximate estimate of quantities can be given in advance. The total cost under each bid for the several items of work in which the quantities are known, to a reasonable degree of certainty, was first ascertained in the usual manner. This amount being subtracted in each case from the amount of the appropriation indicates the sum available for the *tunnel lining*, which will consist mainly of concrete masonry; that bid which will admit of placing the greatest amount of lining in addition to completing the determinate quantities of work in the other classes is taken as the lowest. In this calculation it is assumed that the proportions of brick masonry and dry stone packing will be in the proportions of 1, 4, and 1, respectively.

In this manner the lowest bidder is found to be J. H. Dewees & Co., but for the reason that their "bidder's bond" is fatally defective, that they have failed to comply in important particulars with the requirements of the advertisement and of instructions to bidders, as set forth more fully in the memoranda submitted herewith, I recommend the rejection of their bid.

The next lowest bidder is Beckwith and Quackenbush, of Mohawk, N. Y. From the evidence submitted these parties appear to be fully qualified to do the work, and they have on hand a considerable plant available for the immediate commencement of operations. Prior to the preparation of their bid they made careful and intelligent examinations of the proposed work, drawings, &c. I recommend that the contract be awarded to this firm.

Very respectfully, your obedient servant,

G. J. LYDECKER.
Major of Engineers, U. S. A.

[9 enclosures.]

[First indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
October 18, 1883.

Respectfully submitted to the Hon. the Secretary of War.

For the reasons fully set forth in the memoranda accompanying Major Lydecker's communication, I am of opinion that the bid of Messrs. J. H. Dewees & Co., the lowest, should be rejected, and the contract awarded to Messrs. Beckwith & Quackenbush, of Mohawk, N. Y., the lowest *responsible* bidders, and should you concur, the action suggested will be taken by me.

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

2907 R. and H., 1883.

[2d indorsement.]

The suggestion of the Chief of Engineers is approved, and action will be taken accordingly.

ROBERT T. LINCOLN,
Secretary of War.

WAR DEPT., *Oct.* 20, '83.

[Committee No. 17.]

J. H. Dewees & Co. to Secretary of War, asking reconsideration of award o Beckwith & Quackenbush, and claiming to be the lowest bidders for constr for increasing water supply of Washington, D. C.

No. 1701 BOUNDA
Washington, D. C., Oc

To the Hon. the SECRETARY OF WAR,
United States:

SIR: I learn through the daily newspapers of this city that you have work of construction of tunnel for increasing the water supply of Wa C., the bids for which were opened October 5th, 1883, to Messrs. Beckwith enbush, of Mohawk, N. Y., and have assigned as the reason therefor t the lowest bidders for such work.

I am surprised that you have permitted yourself to fall into so grave asmuch as from the information that I have obtained, and which I dee am satisfied that I and my associates are the lowest bidders by many t dollars and able to respond to the conditions of the letting in other resp

May I therefore ask that you will re-examine such bids and reconsid you have taken, and thereupon award the said work to the parties found the lowest bidders?

Very respectfully, yours,

J. H. DEWE
For J. H. DEWE

P. S.—Will you please advise us of the amount of our bids and the b with & Quackenbush; also of the amount of bonds required and the which the same is required to be executed?

J. H. DEWE

[First indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S.
Octob

Respectfully returned to the Hon. the Secretary of War, with the le G. J. Lydecker, Corps of Engineers, submitting the abstract and propos papers for the construction of the tunnel, with my indorsement there attention is invited, and which, it is believed, will furnish full informat subject.

H. G. W
Chief of Engineers, Brig. and Bvt.

2981—R. & H. '83.
2907 " " " herewith.

[Committee No. 18.]

MEMORANDA RELATING TO BID OF J. H. DEWEES & CO.

The bidders' bond is fatally defective, the bidders not being bounde thing; the justification of sureties is not sworn to.

The combination is not an established firm, but seems to have been bid on these works; the place of residence of bidders is not given, as paragraph 7 of instructions to bidders; there appears to have been some as to the name of the firm, which on one case is signed J. *H.* Dewees and C J. *G.* Dewees and Co., while in a third it is written both ways, and in this appear that the name Dale was originally written instead of Dewees.

No written evidence is submitted, as required by the advertisemen their ability to perform the work, either as referring to their experienc like character, plant at their disposal, or financial standing. In an in Mr. Dewees, with a view to obtaining information on these points, h they did not own any plant, but had arranged to procure second-hand m subsequently telegraphed to one of the parties with whom it was repr this arrangement had been made, but the fact was denied in the followi "No, sir. Have made no arrangements with them of any kind." Mr. not state what machinery he proposed to use, what or how much woul nor give an approximate estimate of the steam-power required; considers diamond drill as probably the best for the work, though Ingersoll's i

one; thinks that one drill will be sufficient for each heading, but can not say how much progress would be made in this manner. In the absence of any precise information on these important points it is difficult to understand how any intelligent estimate of cost could have been made, yet Mr. Dewees states that he made his bid on the tunnel without advice on these points, and that it was predicated almost entirely on prices bid, or paid, for other kinds of tunnels in other localities. Further, the bid was made without examination of the drawings or other information relating to the work on file in this office. Finally, the blanks for proposals were not obtained directly from this office by any member of the firm, but indirectly through an outside party, in such manner as to suggest the idea that the bidders doubted their ability to 'show *prima facie* evidence that they were able financially and by experience to undertake the work" as required by the published advertisement.

The further I have examined into this matter the more I am convinced that the interests of the Government demand the rejection of this bid.

Respectfully submitted.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 10.]

Advertisement, instructions, specifications, proposals, and bidder's bond for construction of tunnel for increasing the water supply of Washington, D. C.

[Advertisement.]

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., August 29, 1883.

Sealed proposals, in triplicate, for the work required for increasing the water supply of the city of Washington, in accordance with the act of Congress approved July 15th, 1882, will be received at this office until 12 o'clock noon, on Friday, October 5th, 1883, when they will be publicly opened; the work to be done comprises three different classes, viz:

* * * * * * *

Class B.—Aqueduct extension.—Being the extension of the Washington Aqueduct by a tunnel about 20,826 feet long, with a cross-section of about 77 square feet; most, if not all, of the tunnel will be through hard gneiss rock.

* * * * * * *

Separate proposals, in triplicate, must be made for each class. Parties proposing to bid will apply at this office for blanks for proposals, specifications, and all information, being careful to state for which class or classes of work blanks are desired; but they will be furnished only to such parties as show *prima facie* evidence that they are able, financially and by experience, to undertake the work on which they propose to bid.

Each bidder must submit with his proposals written evidence on which he relies to establish his capacity to perform the work, reference being had to his experience on work of like character, to the plant at his disposal and which he proposes to use, and to his financial ability to do all that is necessary for a rapid prosecution of the work. Before proposals are opened each bidder must certify to the undersigned that either personally or by a duly authorized agent he has inspected the natural features of the locality in which the work is located and examined the drawings on file in this office.

The right is reserved to reject any and all bids or parts of bids.

G. J. LYDECKER,
Major of Engineers, U. S. A.

GENERAL INSTRUCTIONS FOR BIDDERS.

1. All proposals must be in triplicate, on the accompanying form. They must be enclosed in a sealed envelope, and endorsed "Proposals for construction of tunnel." This parcel should then be placed inside a second envelope and be addressed to *Office of the Washington Aqueduct, Georgetown Station, Washington, D. C.* No responsibility shall attach to the officer in charge for the premature opening of any proposal not endorsed as above directed.

2. The bidder's bond—executed in triplicate—must be signed by two (2) responsible sureties in the sum of seventy-five thousand dollars ($75,000), to be certified to as good and sufficient sureties by a United States district attorney, collector of customs, or any other officer under the United States Government, or responsible person known to this office.

3. A firm will not be accepted as a surety, nor will a partner be accepted as surety for a copartner or for a firm of which he is a member.

4. An officer of a corporation will not be accepted as surety for such corporation.

5. Where firms bid, the individual names of the members should be written out and should be signed in full, giving the Christian names; but the signers may, if they choose, describe themselves, in addition, as doing business under a given name and style as a firm.

6. Signatures of obligor and sureties to bidder's bond must have affixed to them seals of wax or wafer.

7. The place of residence of every bidder, with county and State, must be given after his signature, which must be written in full.

8. Any one signing a proposal as the agent of another, or of others, must file with it legal evidence of his authority so to do.

9. Alterations by erasures or interlineations should be explained or noted in the proposal over the signature of the bidder.

10. If a bidder wishes to withdraw his proposal he may do so before the time fixed for the opening, without prejudice to himself, by communicating his purpose in writing to the officer who holds it, and when his proposal is reached it will be handed to him or his authorized agent unread.

11. All prices must be written as well as expressed in figures.

12. The contract which the bidder promises to enter into shall be in the form adopted and in use by the Engineer Department of the Army, blank forms of which can be inspected at this office. Parties making bids are to be understood as accepting the terms and conditions contained in such form of contract.

13. Reasonable grounds for supposing that any bidder is interested in more than one bid for the same item will cause the rejection of all bids in which he is interested.

14. The United States reserves the right to reject any and all bids; also to disregard the bid of any *failing bidder or contractor*, known as such to the Engineer Department.

15. The bidder must satisfy the United States engineer in charge of his ability to furnish the materials or perform the work for which he bids. The character of the machinery to be used and the capacity and standing of the bidder will be considered in making the award.

16. Transfers of contracts or of interests in contracts are prohibited by law.

17. Bidders are invited to be present at the opening of the bids.

SPECIFICATIONS.

Description.—The work to be done is the construction of twenty thousand eight hundred and twenty-six (20,826) feet, more or less, of tunnel, about eleven (11) feet wide, and seven and one-half (7½) feet high from the present distributing reservoir above Georgetown to the proposed new reservoir east of Howard University.

The east working shaft of the tunnel is located within the limits of the reservoir, and in case of separate awards the contractors will be required to conduct their respective works in such a manner as not to interfere with each other. To this end the contractor for the reservoir will commence work by excavating around the shaft to the prescribed lines and slopes, and in the shortest time possible complete the excavation for a distance of five hundred (500) feet about the shaft. Rock excavated from the tunnel will be deposited by the contractor for the same within these limits, and will be hauled thence, sorted and piled by the reservoir contractor for subsequent use on his work. The tunnel contractor will remove and pile, within the limits above designated, such stone as he will require for lining his work on this section. In case of conflict between the contractors on any matter affecting the prosecution of their works the United States engineer shall act as arbitrator, and his decision shall be binding on both parties.

Geological formation.—The formation through which the tunnel will be driven is believed to be a compact gneiss rock, such as may be seen in close proximity to the line exposed in quarries, and the outcrops in the valleys of Rock Creek and of Foundry Branch, where two of the working shafts are located, and elsewhere.

At the site of the east shaft a trial shaft has been sunk, and 1,500 feet west of this on the line, a bore hole put down into the rock. These show the same characteristic formation which is exposed at Rock Creek, Foundry Branch, and elsewhere along the line where the rock outcrops on the surface, or where it has been quarried or otherwise excavated. Bidders are referred to the general plan of the work, which gives the location of rock indications observed by this office, and to memorandum of same. They will be required, however, to determine for themselves the formation through which the tunnel will probably be driven, and it is to be expressly understood that no difficulties whatever arising from the character of material through which the tunnel and shafts may be driven will be recognized as valid grounds for any claim against the United States for compensation over and above prices named in the bid.

Location of shafts.—Four working shafts will be sunk simultaneously to such depth as may be required, the object being to penetrate the rock sufficiently to insure a continuous roof of sound rock for the tunnel; one will be at the site of the present trial shaft, east end of tunnel, one at Champlain avenue, one at Rock Creek, and one at Foundry Branch. The east shaft will be sunk about one hundred and thirty-six (136) feet below the present surface, or one hundred and twenty-one (121) feet below bottom of the new reservoir, within which it is situated; the Champlain avenue shaft one hundred and ten (110) feet; the Rock Creek shaft, forty (40) feet; and the Foundry Branch, forty-six (46) feet below the present surface. In additions to these a connecting shaft will be sunk at the distributing reservoir, at the western terminus of the tunnel, to a depth, approximately, of forty (40) feet below the surface.

Each shaft is measured from the surface of ground to roof of tunnel, but includes a sump of about seven (7) feet in depth. The depth of sump will be prescribed hereafter, and will be paid for as shaft excavation.

East shaft and west connecting shaft.—The east shaft and west connecting shaft, down to sound rock, will be nineteen (19) feet square in the clear inside the timbering, with such temporary partitions as may be required for adaptation to use as a working shaft or for bracing. Below this, in sound rock requiring no timbering, the section will be a circle fourteen (14) feet in diameter; they are to be permanent shafts, and will be finished, after the completion of work on the tunnel, by a lining of brickwork, concrete, and dry-stone packing fourteen (14) feet interior diameter, extending from the solid rock to the surface of the ground, as shown on plans. The main timbers and lagging will be left in position and the concrete thoroughly rammed against them, and the interior timbers and braces will be removed as this work proceeds towards the surface of the ground.

During the process of placing the lining, and until the mortar and concrete have become set hard, all water must be diverted in such manner as to keep the work dry.

Champlain avenue, Rock Creek, and Foundry Branch shafts.—The Champlain avenue, Rock Creek, and Foundry Branch working shafts will be rectangular in plan, and not less than eight (8) by fourteen (14) feet in the clear, inside the timbering (the longer axis being in a vertical plane with the axis of the tunnel), and, after completion of work on the tunnel, must be secured with masonry arches over the tunnel and adapted to their final uses in such manner as is indicated on drawings or as may be prescribed hereafter.

Air shafts.—Three air shafts will be sunk at the points indicated upon the general plan, to the roof of the tunnel. They are intended for the escape of confined air from the completed tunnel, when running full of water. They will be lined with cast-iron pipe of four (4) inches interior diameter and one-half (½) inch thickness of shell, having water-tight joints. The pipe will be supported at the roof of the tunnel, and the joint between the exterior of the pipe and the rock or masonry, constituting the roof of the tunnel, will be made water-tight. These shafts will be about 130, 136, and 150 feet in depth.

Headings.—From the east shaft one heading will be driven westward. From the Champlain avenue, Rock Creek, and Foundry Branch shafts two headings will be driven simultaneously.

Cross-section of tunnel.—The cross-section of tunnel will be rectangular, eleven (11) feet wide by seven and one-half (7½) feet high, except where lining is required, when the cross-section of excavation will be increased to such limits as the United States engineer shall indicate. In all cases the prescribed section must be preserved, and no payment will be made for material excavated outside the specified lines and grades; but all loose or insecure rock outside these lines, whether resulting from natural causes or from the prosecution of the work, that may be likely to fall into the tunnel must be removed. In cases where the necessity for such removal is not occasioned by the shattering of the rock by blasting, but is due to the natural seams, cracks, or fissures, a fair price will be paid for removing the same; if the necessity results from the operation of blasting, the removal must be at the expense of the contractor. All questions arising in this connection will be determined by the United States engineer, and the price to be paid for removal will be fixed by him, and his decision shall be accepted by the contractor as final. All excavated and dislodged material will be promptly removed, hoisted to the surface of the ground, and deposited at such points as may be directed, within five hundred (500) feet of the shaft.

Timbering.—Should timbering be required at any point of the tunnel it will be put in at the expense of the contractor and to the satisfaction of the United States engineer, so as to make the tunnel perfectly secure until masonry can be substituted for the timber.

Masonry lining of concrete.—The masonry lining for the tunnel wherever required for arch, abutments, or inverts, will, in general, be of concrete, the excavated rock being used for the purpose. It must be put in as the work progresses, so as to be completed at the same time as the excavation of the tunnel. It will be provided with such dry-stone packing and such inlets for water as may be required: *Provided*, That

inlet pipes or valves, wherever used, shall be furnished by the United States, and shall be set by the contractor without extra charge.

Centering.—Suitable forms and centers will be provided by the contractor, and will be of such character as will not interfere with the movement of cars and material through the tunnel. The surfaces of these, in contact with the concrete, will be of such character as to prevent adhesion of the concrete or injury to it.

Drills and compressed air.—The excavation of the tunnel will be effected by means of the best quality of power drills, using compressed air as a motor. A sufficient number of these will be provided by the contractor to insure the continuous work of not less than four at each breast, and they will be of such capacity for work as to insure a daily progress in rock of seven feet at each heading. The air will be taken from the head of each shaft to the breast in iron pipes of not less than four (4) inches interior diameter, with joints made absolutely secure against leakage and loss of air. Hand-drilling may be used to supplement the work of the drills, but the contractor shall work continuously as many power drills of the best manufacture as can be used in the tunnel. The compressed air will be provided by the contractor at the head of each working shaft, at such pressure as to give not less than sixty (60) pounds per square inch at each drill, in the following proportions: At the east shaft not less than one hundred and twenty-five (125) cubit feet per minute, at Rock Creek shaft, Champlain avenue shaft, Foundry Branch shaft, each not less than two hundred and fifty (250) cubic feet per minute, and such greater quantity at each shaft as can be usefully consumed. The contractor will be required to provide suitable machinery of actual, not theoretical, capacity to furnish the above amounts of compressed air at the pressure hereinbefore specified. All the working plant shall be subject to the approval of the United States engineer, who shall have the right to order any changes in the character or amount of the same, which, in his opinion, may be necessary for the satisfactory completion of the work within the time prescribed.

The contractor will be required to make suitable provisions for pumping, hoisting, timbering, and ventilating, and all other incidental work, providing the best appliances for every necessary purpose. The details of all such appliances will be left to his discretion, excepting as herein specifically prescribed, and the responsibility will be his for their efficient and satisfactory performance; he will be responsible for the safety, comfort, and convenience of men employed by him and of the duly authorized agents and employees of the United States in and about the work. He will not be entitled to any equitable consideration because of the failure of such appliances to properly and promptly accomplish the purpose, nor for any resulting delay in the completion of the tunnel.

Material.

All material used in any of the foregoing work must be of best quality of its kind and satisfy the following conditions: It will all be carefully inspected before being placed in the work, under the direction of the United States engineer, and such as is not satisfactory must be removed from the site of the work by the contractor. The contractor will be required to furnish all labor necessary to handle material and to aid the inspector in his inspections.

Cement.—The cement used must be equal to the best brand of Cumberland cement, and must show a tensile strength of seventy-five (75) pounds per square inch after it has been mixed with water, allowed to set, and then immersed in water for twenty-four (24) hours. It must be firmly ground, freshly burned, and sufficiently slow setting to admit of working into concrete and being put into position without loss of strength through premature setting.

Sand.—All sand must be clean, sharp, and angular, and absolutely free from clay or other foreign matter. The use of bank sand will not be allowed. Sand used for concrete must be coarse, and that for mortar in brick and stone masonry must be sufficiently fine to make suitable joints of the required dimensions.

Water.—The water used for mortar and concrete must be free from clay, earth, or other impurities.

Mortar.—Mortar, whenever used in this work, must be composed of sand and cement in the proportion of one barrel—three hundred (300) pounds—of cement and two (2) barrels of loose sand; these ingredients will be thoroughly mixed dry, and a sufficient quantity of water afterwards added to form a rather stiff paste; it will be used within one (1) hour after mixing, and not at all if once set. All mortar must be mixed and made in tight boxes provided by the contractor.

Stone for concrete.—The broken stone will be sound rock obtained in excavating the tunnel, and will be broken or crushed so as to measure no more than one and one-half inches in the largest dimensions. It must be absolutely free from dust, dirt, or earthy matter.

Concrete.—All concrete used on the work will be made as follows: One measure of cement will be thoroughly mixed dry with two measures of sand; water will then be added to make a mortar, and four measures of broken stone will be thoroughly

incorporated with the mortar. The resulting concrete must be free from surplus water, but thoroughly moistened throughout, and the voids between stones completely filled by the mortar, with mortar in excess. The broken stone used for this purpose shall be such as to measure no more than one and one half (1½) inches in any direction, and shall be absolutely free from dust, dirt, or earthy particles. All concrete must be mixed and placed in position within the time required for the setting of the cement, in such manner that the maximum strength of the cement shall be secured in the work, otherwise it will be removed and replaced at the expense of the contractor until this object shall be attained. Concrete will be placed in uniform layers not exceeding six (6) inches in thickness, and will be carefully rammed or rolled to the satisfaction of the United States engineer.

Packing.—Dry stone packing will be used for filling large void spaces wherever this can be advantageously done to save concrete masonry. The stone will be of irregular sizes and closely packed in position, the smaller ones being used to wedge between the larger ones.

Brick-work.—The best quality of whole new bricks burned hard entirely through, free from cracks, with true smooth faces, and with a crushing strength of not less than five thousand (5,000) pounds per square inch will be used, and will be thoroughly wet by immersion or drenching immediately before laying. Every brick is required to be laid in full mortar joints (on bottom, sides, and ends), which for each brick are to be formed at one operation. In no case is the joint to be made by working in the mortar after the bricks have been laid; every second course will be laid with a line, and joints will not exceed three-eighths (⅜) of an inch. They will be laid with such bond as may be prescribed.

Miscellaneous.

General requirements.—The entire work must be completed on or before June 30, 1885. All work and workmanship must be the best of its kind, satisfactory in every respect to the United States engineer; and likewise to his satisfaction all operations must be carried on with the utmost vigor, with ample force, and all necessary machinery and plant, of kinds best adapted to the purpose, and required to insure the greatest possible progress in the prosecution of the work. The right is especially reserved to the United States engineer to direct the employment of additional workmen and the use of additional or better machinery when, in his opinion, this course is necessary to the accomplishment of the purposes above stated. The contractor will be responsible for the orderly behavior of his working force, and will be required to discharge, and keep his force free of, all disorderly or insubordinate employees. Failure on the part of the contractor to comply with any of the requirements contained in this paragraph will be authority for the United States to annul the contract and proceed with the work in such manner as may be deemed necessary for its most speedy and economical completion, and to withhold from the contractor all retained percentages and other moneys that may be due or become due.

Payments will be made monthly on estimates prepared by inspectors and approved by the United States engineer, and ten (10) per centum of the amount due on each payment will be retained until the final completion and acceptance of the work. The first payment will not be made until the work shall have been carried on in a manner satisfactory to the United States engineer throughout one full calendar month, and the estimate for that payment will include all work accepted up to the last day of said month. Subsequent payments will be made as soon after the close of the month to which they relate as the estimates and accounts can be prepared, generally by the 8th day of each month. It is to be expressly understood that payments on account of the several items included in the proposal hereto attached will be in full for all work and material required to accomplish and complete everything required by these specifications. The contractor must assume all risks incident to the work and to its preservation, in all its parts, until final acceptance. On completion of the work and before final payment the contractor must remove all machinery, rubbish, and refuse material from the site of the work and from the land pertaining thereto.

To prevent dispute and litigation it is expressly stipulated that the decision of the United States engineer shall be final as to the true meaning and intent of these specifications and on all questions of measurement made under them; and further that the said engineer shall have the right—

1st. To correct any errors or omissions necessary to a proper fulfillment of the intent of these specifications.

2d. To modify them whenever, in his opinion, it may be necessary for the proper accomplishment of the object in view. Written notice of any modification will, in each case, be furnished the contractor by the United States engineer, and no claim for extra allowance, on account of such modification, will be considered or allowed, unless presented in writing to the said engineer by the contractor within forty-eight

hours after receipt of the notice. The fair allowance, if any, to be ma
termined by the United States engineer.

3d. To order such extra work as may, in his opinion, be necessary,
tractor is cautioned to do no such work until he shall have received a
for the same from the United States engineer aforesaid, such order bei
essential to the consideration and allowance of any claim whatever fo
pensation; the fair compensation thereupon to be allowed will be deter
United States engineer.

The following *approximate* estimate of quantities will be considered
the total of each bid as a basis of award; but no variations in these am
from erroneous computations, or from changes made during the progress
will be regarded as grounds for any claim against the United States, it be
understood that the contractor is to do all that is necessary to accompli
in view (neither more nor less), as required by the United States engine

Approximate estimate of quantities.

Excavation in tunnel ..... cubic y
Earth excavation in shafts .....
Rock excavation in shafts .....
Brick masonry in shafts .....
Concrete masonry in shafts .....
Dry stone packing in shafts .....
Air-shafts, complete ..... lineal

Masonry lining of tunnel not estimated, but in computing the bids fo
a definite quantity will be assumed.

PROPOSAL.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.

SIR: In accordance with your advertisement of August 29, 1883, invit
for construction of tunnel for increasing the water supply of Washingt
subject to all the conditions and requirements thereof, and of your spe
the same date, copies of both of which are hereto attached, and, so far
to this proposal, are made a part of it, —— propose to furnish the mater
work at the following prices, viz:

Will do all excavation in tunnel at ——— (——) dollars ——— (—
cubic yard.

Will do all earth excavation in shafts at ——— (——) dollars and ——
per cubic yard.

Will do all rock excavation in shafts at ——— (——) dollars and ——
per cubic yard.

Will furnish material for and lay brick masonry in tunnel at ———
and ——— (——) cents per cubic yard.

Will furnish material for and place concrete masonry in tunnel at —
lars and ——— (——) cents per cubic yard.

Will furnish material for and place dry stone packing in tunnel at
dollars and ——— (——) cents per cubic yard.

Will furnish material for and lay brick masonry in shafts at ———
and ——— (——) cents per cubic yard.

Will furnish material for and place concrete masonry in shafts at —
lars and ——— (——) cents per cubic yard.

Will furnish material for and place dry stone packing in shafts at —
lars and ——— (——) cents per cubic yard.

Will furnish material for and build air-shafts complete at ——— (—
——— (——) cents per lineal foot.

—— make this proposal with a full knowledge of the kind, quantity
of the materials and work required, and, if it is accepted, will, after re
ten notice of such acceptance, enter into contract within ten days, w
sufficient sureties for the faithful performance thereof, and will com
operations within —— days after the contracts are signed.

[Signature]
[Address] Town of
County of
State of

In case of a firm, add names of partners.

(Signed in triplicate.)

Bidder's bond.

Know all men by these presents, that we* ——— ———, of ——— ———, as principal, and ——— ———, of ——— ———, and ——— ———, of ——— ———, as sureties, are held and bound unto the United States of America, in the penal sum of seventy-five thousand dollars ($75,000), to the payment of which sum, well and truly to be made, we do bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents.

Given under our hands and seals this ——— day of ———, 1883.

The condition of this obligation is such that, whereas, the above bounden* ——— ——— in response to a public advertisement and notice, dated August 29, 1883, and given and published by Major G. J. Lydecker, Corps of Engineers, United States Army, ha— made and presented to Major G. J. Lydecker, Corps of Engineers, United States Army, a formal proposal, in writing, whereby —he— ha— proposed and agreed to enter into a contract with Major G. J. Lydecker, Corps of Engineers, United States Army, for construction of tunnel for increasing the water supply of Washington, D. C., according to the terms and conditions set forth in said advertisement and notice.

Now, therefore, if the said* ——— ——— shall not withdraw† —— said proposal within sixty days from the date of opening the proposals, and shall within ten days from the date on which —— may be notified that —— said proposal has been accepted, and the said contract awarded to —— (provide such award be made within the sixty days above mentioned), duly and formally enter into such contract agreeably to the terms of —— said proposal, and into such bond for its due performance as shall be required of, ——, or if —— said proposal shall not be accepted and such contract not be awarded —— then this obligation shall be void, otherwise, that is to say, if either —— shall withdraw —— proposal within said sixty days, or fail to enter within said ten days into such contract if awarded —— and into such bond, to remain in full force, effect, and virtue.

Witnesses:

——— ———. ——— ———.‡

——— ———. ——— ———.‡

——— ———. ——— ———.‡

(Executed in triplicate.)

Justification of the sureties.

STATE OF ———,
County of ———, *ss:*

I, ——— ———, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of ——— thousand dollars ($——) over and above all my debts and liabilities.

[Signature of surety.] ——— ———.

Before me,
[Signature of officer administering oath, with seal, if any] ——— ———.

STATE OF ———,
County of ——— *ss:*

I, ——— ———, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of ——— thousand dollars ($——) over and above all my debts and liabilities.

[Signature of surety] ——— ———.

Before me,
[Signature of officer administering oath, with seal, if any] ——— ———.

Certificate.

I, ——— ———, do hereby certify that ——— ———, and ——— ———, the sureties above named, are personally known to me, and that, to the best of my knowledge and belief, each is pecuniarily worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

[Signature of certifying official] ——— ———.

NOTE.—The certificate may be given separately as to each surety, and modified accordingly.

* Insert full name of each bidder or partner.
† Fill remaining blanks with the words "he," "his," or "him," "they," "their," or "them," as the sense demands.
‡ Add seal of wax or wafer.

[Form 19.]

Articles of agreement entered into this 29th day of October, eighteen hundred and eighty-three (1883), between Major G. J. Lydecker, Corps of Engineers, U. S. Army, of the first part, and Clinton Beckwith and John V. Quackenbush partners, doing business under the firm-name of Beckwith & Quackenbush of Mohawk, of the county of Herkimer, State of New York, of the second part.

This agreement witnesseth that, in conformity with the advertisement and specifications hereunto attached, and which form a part of this contract, the said Major G. J. Lydecker, Corps of Engineers, for and in behalf of the United States of America, and the said Beckwith & Quackenbush for themselves, their heirs, executors, and administrators, have mutually agreed, and by these presents do mutually covenant and agree, to and with each other, as follows:

That the said party of the second part shall furnish the material and do the work for *construction of tunnel* for increasing the water supply of Washington, D. C. In consideration of the material being furnished and work done as provided for above, the said party of the first part shall pay to the said party of the second part as follows:

For excavation in tunnel, eight (8) dollars per cubic yard.

For earth excavation in shafts, six (6) dollars per cubic yard.

For rock excavation in shafts, ten (10) dollars per cubic yard.

For brick masonry in tunnel, fourteen (14) dollars per cubic yard.

For concrete masonry in tunnel, five (5) dollars per cubic yard.

For dry stone packing in tunnel, two (2) dollars and fifty (50) cents per cubic yard.

For brick masonry in shafts, eighteen (18) dollars per cubic yard.

For concrete masonry in shafts, five (5) dollars per cubic yard.

For dry stone packing in shafts, two (2) dollars and fifty (50) cents per cubic yard.

For air shafts complete, fifteen (15) dollars per lineal foot.

All materials furnished and work done under this contract shall, before being accepted, be subject to a rigid inspection by an inspector appointed on the part of the Government, and such as does not conform to the specifications set forth in this contract shall be rejected. The decision of the engineer officer in charge as to quality and quantity shall be final.

The said Beckwith & Quackenbush shall commence the work on or before the twentieth (20th) day of November, eighteen hundred and eighty-three (1883), and shall complete the same on or before the thirtieth (30th) day of June, eighteen hundred and eighty-five (1885).

If, in any event, the party of the second part shall delay or fail to commence with the delivery of the material or the performance of the work on the day specified herein, or shall, in the judgment of the engineer in charge, fail to prosecute faithfully and diligently the work in accordance with the specifications and requirements of this contract, then, in either case, the party of the first part, or his successor legally appointed, shall have power, with the sanction of the Chief of Engineers, to annul this contract by giving notice in writing to that effect to the party (or parties, or either of them) of the second part; and, upon the giving of such notice, all money or reserved percentage due or to become due to the party or parties of the second part by reason of this contract shall be and become forfeited to the United States; and the party of the first part shall be thereupon authorized, if an immediate performance of the work or delivery of the materials be in his opinion required by the public exigency, to proceed to provide for the same by open purchase or contract, as prescribed in section 3709 of the Revised Statutes of the United States: *Provided, however*, that if the party (or parties) of the second part shall by freshets, ice, or other force or violence of the elements, and by no fault of his or their own, be prevented either from commencing or completing the work, or delivering the materials at the time agreed upon in this contract, such additional time may, in writing, be allowed him or them for such commencement or completion as, in the judgment of the party of the first part, or his successor, shall be just and reasonable; but such allowance and extension shall in no manner affect the rights or obligations of the parties under this contract, but the same shall subsist, take effect, and be enforceable precisely as if the new date for such commencement or completion had been the date originally herein agreed upon.

If, at any time during the prosecution of the work, it be found advantageous or necessary to make any change or modification in the project, and this change or modification should involve such change in the specifications as to character and quantity, whether of labor or material, as would either increase or diminish the cost of the work, then such change or modification must be agreed upon in writing by the contracting parties, the agreement setting forth fully the reasons for such change, and giving clearly the quantities and prices of both material and labor thus substituted for those named in the original contract, and before taking effect must be approved by the Secretary of War: *Provided*, that no payments shall be made unless such supplemental or modified agreement was signed and approved before the obligation arising from such modification was incurred.

No claim whatever shall at any time be made upon the United States by the party or parties of the second part for or on account of any extra work or material performed or furnished, or alleged to have been performed or furnished under or by virtue of this contract, and not expressly bargained for and specifically inclued therein, unless such extra work or materials shall have been expressly required in writing by the party of the first part or his successor, the prices and quantities thereof having been first agreed upon by the contracting parties and approved by the Chief of Engineers.

The party of the second part shall be responsible for and pay all liabilities incurred in the prosecution of the work for labor and material.

Payments shall be made to the said Beckwith and Quackenbush as provided for in the specifications hereto attached.

Neither this contract nor any interest therein shall be transferred by the said Beckwith and Quackenbush to any other party; and any such transfer shall cause the annulment of the contract so far as the United States are concerned. All rights of action, however, to recover for any breach of this contract by the said Beckwith and Quackenbush are reserved to the United States.

No member of or delegate to Congress, nor any person belonging to, or employed in, the military service of the United States, is or shall be admitted to any share or part of this contract, or to any benefit which may arise herefrom.*

This contract shall be subject to approval of the Chief of Engineers, U. S. A.

In witness whereof the undersigned have hereunto placed their hands and seals the date first hereinbefore written.

Witnesses:

SIMON NEWTON. G. J. LYDECKER, [SEAL.]
Major Eng'rs, U. S. A.

JOHN M. LASKEY. BECKWITH AND QUACKENBUSH. [SEAL.]

(Executed in quintuplicate.)

Approved November 19, 1883.

JOHN G. PARKE,
Acting Chief of Engineers.

† I do solemnly swear that the foregoing is an exact copy of a contract made by me personally with ——— ———: that I made the same fairly, without any benefit or advantage to myself, or allowing any such benefit or advantage corruptly to the said ——— ——— or any other person; and that the papers accompanying include all those relating to the said contract as required by the statute in such case made and provided.

———,
Major of Engineers.

Subscribed and sworn to before me this ——— day of ———

———,
———

———

[Committee No. 20.]

Lydecker, Major G. J., transmits for approval supplemental contract, in quintuple, with Beckwith & Quackenbush, designed to fix the status of parties in interest on tunnel of Washington Aqueduct, pending suspension of work until further appropriation is made, with subsequent indorsements.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., December 8, 1887.

The CHIEF OF ENGINEERS, U. S. A.,
Washington, D. C.:

SIR: I have the honor to transmit herewith supplemental articles of agreement which are designed to fix the status of the parties in interest on the tunnel for the Washington Aqueduct extension, pending the period of suspension that must last until further appropriation is made for continuing the work.

* NOTE.—Here add to any contract made with an incorporated company for its general benefit the following words, viz: "But this stipulation, so far as it relates to members of or delegates to Congress, is not to be construed to extend to this contract.—*See* sec. 3740, Revised Statutes.

† NOTE.—This affidavit is required only on the quintuplicate copy of contract intended for the returns office, Department of the Interior.

NOTE.—The copy of contract for the Bureau must be accompanied with an abstract of the bids, and copy of each bid and advertisement, unless previously furnished.—*See* G. O. No. 72, A. G. O. of 1879, par. XII, p. 3.

As I understand the matter, all existing contracts relating to this work must end with the expenditure of appropriations heretofore made for its prosecution. There is still a small balance in hand, but not enough to warrant further active operations at this time; in the mean time it is desirable, in the interests of the Government, that the plant on the work should not now be removed, in order that the tunnel may at any time be emptied for inspection, or other purposes, and it is likewise probable that it may be used to advantage when work is resumed, whether by the present or other contractors. But, as the work already done by the contractors has been paid for to the extent of only 90 per cent. of its estimated value at contract prices, and as the work to be done is believed not to be covered by the existing contracts, it appears to be neither equitable, nor necessary under these contracts to longer withhold the 10 per cent. retained as a guarantee for the work actually done under them. Therefore, it is stipulated that 85 per cent. of this retain should now be paid to the contractors.

The balance of the articles are simply intended to provide for such pumping as may be found necessary under the directions of this office, until active work is resumed, predicated on the idea that the Government shall assume the actual cost of pumping, in addition to keeping one competent man in charge of the two most important pumps during the inactive period. Continuous pumping is not deemed necessary during this period of suspension, differing in that respect from the conditions existing during the previous period of suspension in 1886.

These articles are respectfully submitted for consideration and approval, it being understood by the signing parties that they are to become operative only when approved as specified therein.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[5 enclosures.]

[1st indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
Dec. 16, 1887.

Respectfully submitted to the Secretary of War. It is desirable to provide for the pumping of the tunnel during the suspension of active operations. Since it is not to the advantage of the Government to have the work finished, the plant removed, and the contract closed at the present time, the payment to the contractors of 85 per cent. of the amount retained from past payments, is under the circumstances, considered equitable. The balance still retained will be amply sufficient to secure the Government for the finishing work necessary to close the contract. The supplementary articles of agreement being considered mutually advantageous to both parties, have been approved by the Acting Chief of Engineers, and their approval by the Secretary of War is recommended.

CHAS. W. RAYMOND,
Acting Chief of Engineers.

$\frac{4326}{IV.}$ 1887

Ins. 1 of 3156. R. H., '83
" 9 " $\frac{1515}{IV.\ '87}$ } herewith.

[2nd indorsement.]

WAR DEPARTMENT, *December* 19, 1887.

Respectfully returned to the Acting Chief of Engineers with supplemental contract approved this date.

By order of the Acting Secretary of War.

JOHN TWEEDALE,
Chief Clerk.

[3rd indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
Dec. 21, 1887.

Respectfully transmitted to Major G. J. Lydecker, Corps of Engineers, with three copies of supplementary articles.

This paper to be returned.

By command of Brig. Gen. Duane.

THOS. TURTLE,
Captain of Engineers.

$\frac{4326}{IV}$ 1887.

Incl. 3, 4, and 5 of $\frac{4326}{IV.\ 87.}$

[4th indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, December 22, 1887.

Respectfully returned to the Chief of Engineers, U. S. Army.

G. J. LYDECKER,
Major of Engineers U. S. A.

L. R. 3063.

[Committee No. 21.]

TREASURY DEPARTMENT, *Nov. 13th*, 1888.

Hon. GEO. F. EDMUNDS,
Chairman Joint Committee on the Washington Aqueduct Tunnel, U. S. Senate.

SIR: In reply to the inquiries presented by you on the 30th ultimo upon the subject of the Washington Aqueduct Tunnel, I have the honor to enclose herewith copy of the report of the First Comptroller in the matter dated the 10th instant, together with a statement showing the appropriations, expenditures, and balances on account of increasing the water supply of Washington, D. C., to and including August 31, 1888.

Respectfully yours,

C. S. FAIRCHILD,
Secretary.

[Committee No. 22.]

TREASURY DEPARTMENT,
FIRST COMPTROLLER'S OFFICE,
Washington, D. C., November 10, 1888.

Hon. CHARLES S. FAIRCHILD,
Secretary of the Treasury:

SIR: In reply to the communication of Hon. Geo. F. Edmunds, chairman Joint Committee on Washington Aqueduct Tunnel, &c., dated October 30th, 1888, addressed to you, requesting certain information in reference to the appropriations, expenditures, and advances on account of increasing the water supply of Washington, D. C., and referred to this office October 31st, 1888, for report, I have the honor to transmit herewith a statement showing appropriations, with date of act, expenditures, and unexpended balances of appropriations—all divided into their various subheads of appropriation—and also total amount advanced and balance unaccounted for, on account of increasing the water supply of Washington, D. C., to and including August 31st, 1888, the accounts for which rendered by Maj. G. J. Lydecker to and including May 31st, 1888, have been settled by this office, and those rendered by him since last-mentioned date to and including August 31st, 1888, are now pending in the office of the First Auditor of the Treasury.

No account has as yet been rendered for the months of September and October, 1888, but the following advance was made for these periods and is the only one for which no account has been rendered, viz, $25,000, September 19, 1888.

While the amount ($1,349,534.55) appropriated under the subhead of "Extension of aqueduct" was in bulk, in the compilation of this statement it will be observed that the expenditures under this subhead have been classified as follows, viz:

Payments to contractors	$976,819.69
Clerks, draughtsmen, &c	13,114.24
Engineers, inspectors, &c	28,607.31
Miscellaneous expenses	14,286.25

In reference to the above item, "payments to contractors," I would state that under the supplemental articles of agreement between Major Lydecker and the contractor, dated December 5, 1887, eighty-five per cent. ($78,279.51) of the ten per cent. ($92,093.54) previously retained from the contractor was paid January 14, 1888, and said item includes this payment. This apparently left a balance due the contractor of $13,814.03, being the remaining fifteen per cent. of the ten per centum on the account previous to this agreement, and there has been retained since on payments to contractor the sum of $7,744.25, making an apparent total retain of $21,558.28 still due the contractor on vouchers presented in the account to August 31st, 1888.

Advances were made in bulk out of the appropriation for "Increasing the water supply of Washington, D. C.," for the reason that subheads of appropriations are not carried on the warrant ledgers of this Department, and therefore no statement of advances made or balances due under any particular subhead of appropriation can be made. Letter of Senator Edmunds returned herewith.

Respectfully, yours,

M. J. DURHAM,
First Comptroller.

[Committee No. 23.]

Statement showing the appropriations, expenditures, and balances on accou the water supply of Washington, D. C.

CLASSIFICATION OF APPROPRIATIONS UNDER SUBHEA

	Date of act.					
	July 15, 1882.	July 7, 1884.	Mar. 3, 1885.	Mar. 26, 1886.	Aug. 4, 1886.	Mar. 18
Land for aqueduct	$51, 370. 00					
Extension of aqueduct	599, 534. 55				$395, 000. 00	$355,
Main connections	165, 400. 00					
Land for reservoir	35, 250. 00	$87, 500. 00	$87, 500. 00			
Reservoir and gate-house	431, 273. 75				160, 000. 00	
Water-rights and land for dam	45, 000. 00					
Dam at Great Falls	145, 151. 00					
Preserving tunnel, etc				$5, 000. 00		
Protection Chesapeake and Ohio Canal	12, 300. 00					

CLASSIFICATION OF EXPENDITURES UNDER SUBHEAD

	Expenditures to May 31, 1888.	Expendi to Aug. 1888.
Land for aqueduct	$26, 439. 51	
Extension of aqueduct:		
Payments to contractors	907, 121. 44	$69, 6
Clerks, draughtsmen, etc	12, 265. 24	8
Engineers, inspectors, etc	26, 432. 81	2, 1
Miscellaneous expenses	13, 208. 58	1, 0
Main connections:		
Payments to contractors	113, 356. 41	
Inspectors and miscellaneous expenses	50, 054. 41	
Land for reservoir	209, 435. 72	
Reservoir and gate-house:		
Payments to contractors	399, 009. 85	
Inspectors and miscellaneous expenses	105, 094. 69	1, 2
Water-rights and land for dam	117. 96	
Dam at Great Falls:		
Payments to contractors	129, 509. 02	
Inspectors and miscellaneous expenses	10, 976. 46	
Preserving tunnel from floods, etc	5, 000. 00	
Protection Chesapeake and Ohio Canal	12, 300. 00	

BALANCES OF APPROPRIATIONS UNEXPENDED UNDER SUBHEADS
1888.

Subheads.	Appropriations.	Expendi
Land for aqueduct	$51, 370. 00	$26, 4
Extension of aqueduct	1, 349, 534. 55	1, 032, 8
Main connections	165, 400. 00	163, 4
Land for reservoir	210, 250. 00	209, 4
Reservoir and gate-house	591, 273. 75	505, 3
Water-rights and land for dam	45, 000. 00	1
Dam at Great Falls	145, 151. 00	140, 4
Preserving tunnel from floods, etc	5, 000. 00	5, 0
Protection of Chesapeake and Ohio Canal	12, 300. 00	12, 3
Total	2, 575, 279. 30	2, 095, 3

Amount advanced on requisitions for increasing the water supply to August 31, 188
Total expenditures, as shown by above statement, to August 31, 1888

Balance due the United States unaccounted for

[Committee No. 25.]

Report upon the condition of tunnel lining of the extension of the Washington Aqueduct.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., October 11, 1888.

MAJOR: I have the honor to submit the following report upon the condition of the tunnel lining: While the charges of defective lining in the tunnel, which first appeared in the newspapers, were of so general and indefinite a nature that no clue was given by which its location could be determined, and the persons making those charges declined to give me any information upon which to base an investigation, yet, due to the courtesy of reporters for the city press, definite specifications as to the position of bad work have been obtained.

My investigations have included, first, an examination of the places specified; second, a general examination of the work of the inspectors at present employed.

The method of investigation consisted in drilling holes through the brick arch into the masonry packing and, where defective work was thus shown, cutting a hole through the arch of sufficient size to determine its nature. In a number of places cross-sections were made through the lining, which will illustrate the general character of the work.

The result of the investigation may be summarized as follows: The brick-work has invariably been found to be good; the masonry side walls appear to be solid, but defects are found in the masonry packing behind the brick arch. That done under the inspection of O'Brien is criminally bad. His work was chiefly confined to the key of the arch, and this investigation shows a series of empty pockets above the brick-work, separated by masonry walls, which appear to have been constructed only when there was danger of inspection.

The work under the inspection of McNamara is of a better character and has improved as the inspector has acquired experience. Sections cut through the lining in his early work show the space behind the arch compactly filled with stone, but the amount of mortar employed is insufficient and not properly distributed. Sections inspected after he had supervised about 700 linear feet of lining show a solid masonry backing, and his work done the week before these charges were made public is particularly good. Vacant spaces were found above the key of the arch, one at a place indicated by a reporter and a second in a section opened at the request of McNamara as a sample of his best work. The investigation of the work of inspectors Rowsee, Woodward, and Lucas indicates that it is generally good, though a cavity was found above the key in a section of the lining inspected by Lucas at a point I had been requested to examine.

While the defective work, which my investigations indicate exists, can be repaired at comparatively small expense, a much more extended examination will be required to insure the detection of all defects in the work done under the force as at present organized, and it is suggested that the investigation should extend to work done in former years. A single piece of defective work casts discredit on the entire structure, and every foot of the lining of the tunnel should be most carefully examined.

The method adopted by me of drilling holes at given intervals and cutting out the arch is only adapted to a preliminary survey. It is not only slow and expensive, but will require the repairing of good work as well as bad. There is danger, too, of omitting short sections of defective work. In the New York Aqueduct, where defects of a similar character have been discovered, the services of an expert, who can determine the condition of the packing by sounding the brick arch, have been obtained. If such a man can be found it is recommended that he be employed to continue the examination. It will require, however, a man of long experience in similar work. The modifications of sound, due to the age of the brick-work, its thickness, the dimensions of the cavities, and the character of the packing, will readily deceive an ear not especially trained in this particular lear.

The employment of a hydraulic jack, with a pressure regulated with reference to that which the arch will have to bear when water is introduced, will lead to the detection of any unsafe lining, but it is questionable whether all points would be determined where the requirements of the specifications of the work have not been fulfilled.

Very respectfully, your obedient servant,

C. MCD. TOWNSEND,
First Lieut. of Engineers.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A.

[Committee No. 30.]

Supplemental articles of agreement entered into May, 1888, between Major G. J. Lydecker, Corps of Engineers, of the one part, and Beckwith & Quackenbush, Mohawk, N. Y., of the other part, for construction of tunnel for "increasing the water supply of Washington, D. C."

Supplemental articles of agreement entered into this 8th day of May, eighteen hundred and eighty-eight (1888), between Major G. J. Lydecker, Corps of Engineers, U. S. Army, of the first part, and Clinton Beckwith and John V. Quackenbush, partners, doing business under the firm name of Beckwith & Quackenbush, of Mohawk, of the county of Herkimer, State of New York, of the second part: These articles now herein named, being in furtherance of and supplementary to certain articles of agreement entered into by the parties aforesaid, relating to the construction of a tunnel for increasing the water supply of Washington, D. C., on the 29th day of October, 1883, and to certain supplemental articles of agreement concerning the same, and between the same parties, entered into on the 18th day of October, 1886, and on the 5th day of December, 1887.

Whereas the urgent deficiency act of Congress approved March 30th, 1888, appropriates the sum of $355,000 for completing the Washington Aqueduct tunnel, heretofore in process of construction under the contract and supplemental articles of agreement above named; and whereas said act provides: 1st. That all the work shall be completed by November 1st, 1888; 2nd, that it may be done under the contract heretofore made or by a reletting as in the discretion of the Secretary of War shall be most promotive of the interest of the Government; and, 3rd, that no contract shall be made at prices greater than the prices allowed under contract under which work has been heretofore done on the tunnel. And whereas the Secretary of War has determined that it will be most promotive of the interest of the United States to complete the said tunnel work under the contract and articles supplemental thereto hereinbefore referred to, provided the parties thereto subscribe to the conditions hereinafter named; therefore,

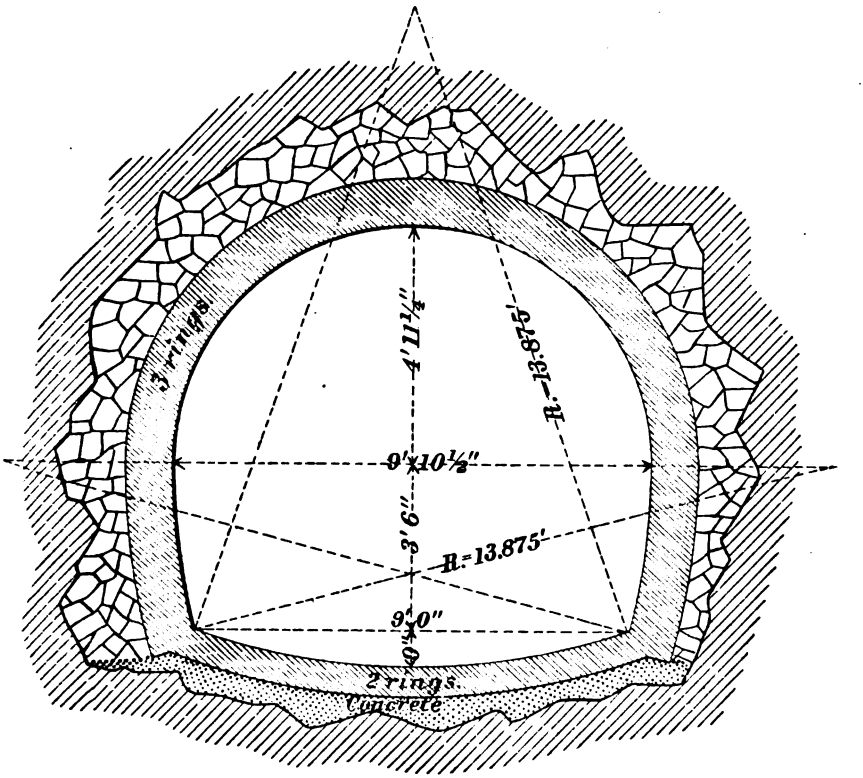
This agreement witnesseth that the said Major G. J. Lydecker, Corps of Engineers, for and in behalf of the United States of America, and the said Beckwith & Quackenbush, for themselves, their heirs, executors, and administrators, have mutually agreed and by these presents do mutually covenant and agree to and with each other as follows:

First. That the parties of the second part shall continue to completion, so far as the money already appropriated shall suffice, the work on the tunnel aforesaid. It being expressly understood that the parties of the second part will use all means in their power to complete the work by the 1st day of November, 1888, and that all instructions from the party of the first part, concerning the steps to be taken to secure completion on said date, shall be promptly obeyed and rigidly adhered to. It is also understood that the tunnel lining to be done under these supplemental articles of agreement will include three classes, viz: 1st. Brick arch, side wall, and invert—such as has heretofore been applied to the work—substantially as shown on tracing hereto attached, in section marked "A." 2d. Rubble masonry side walls, and two-ring brick arch, substantially as shown on tracing hereto attached, in section marked "B." 3d. Rubble masonry side walls and three-ring brick arch, substantially as shown on tracing hereto attached, in section marked "C." The backing in all cases to be of rubble masonry such as called for in previous articles of agreement. The rubble masonry side-walls contemplated herein will be not less than eighteen (18) inches in thickness, and constructed throughout in accordance with the following:

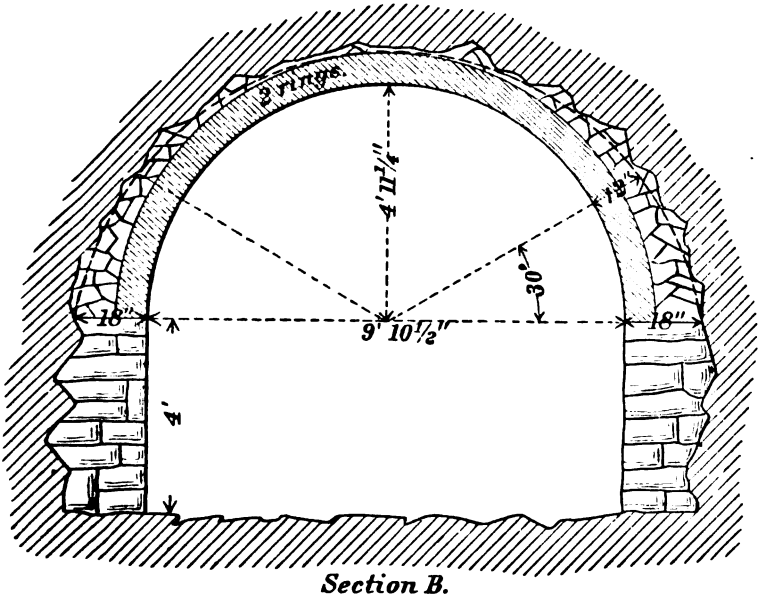
Specifications for rubble side walls.—The rubble side walls provided for in these articles will be constructed of clean, sound, and durable stone, selected for the purpose; they must be carefully laid in cement mortar, in such manner as to fit approximately, being roughly shaped with the hammer, if necessary, to make such fit. Mortar must be freely used so as to solidly fill all spaces between stones and to bulge out beyond the face joints when the stone is placed in position, the object being to make the wall as nearly water-tight as possible. The face of the wall must be laid true to the lines given and so that projections shall not extend more than one and one-half (1½) inches beyond the designated plane of the face; the facing joints shall be neatly outlined and finished, and the top of the wall shall be truly leveled to the spring of the brick arch.

It is further agreed that payment for the aforesaid work of lining shall be as follows: For full lining of 1st class, forty dollars ($40) per linear foot of tunnel so lined: for lining of 2d class, twenty-four dollars and fifty cents ($24.50) per linear foot of tunnel so lined; for lining of 3d class, twenty-eight dollars and fifty cents ($28.50) per linear foot of tunnel so lined: the prices aforesaid being no greater than those allowed under the contract under which work has heretofore been done on the tunnel, and such as will insure the completion of the work within the limits of the sum appropriated therefor. It is expressly understood that the prices paid, as above, include compensation for all work and material necessary for the solid lining of the tunnel

in the several classes, as well as the work of enlarging the tunnel from the normal cross-section to that required for placing the designated lining.

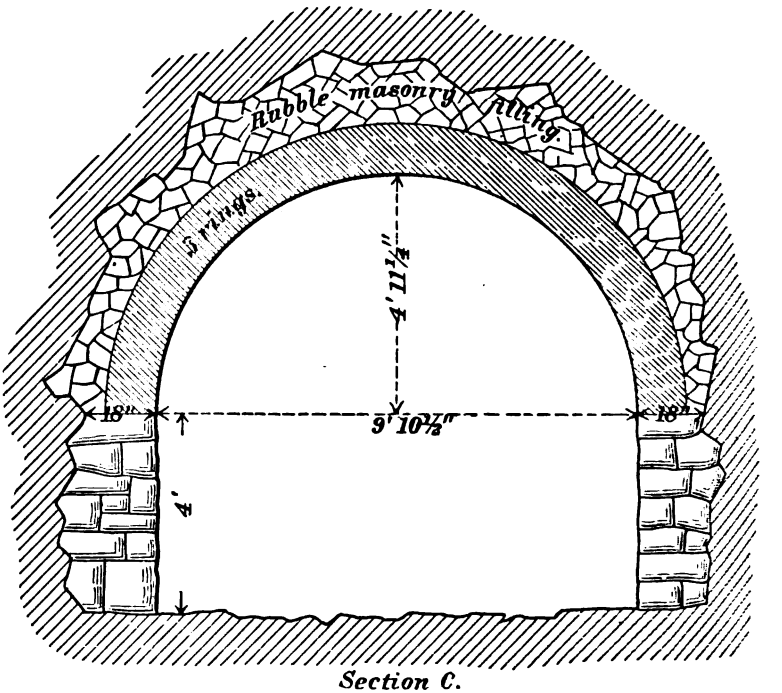


Section A.



Section B.

It is further stipulated and agreed that all brick work in the lining of the tunnel shall be done by expert brick-masons, and that the stone work of said lining shall be done by expert stone-masons.



Section C.

In consideration of the first proviso of the urgent deficiency act hereinbefore named it is also understood and agreed that if work on the tunnel is not completed by the 1st day of November, 1888, the parties of the second part may, at their option, continue to prosecute the work within the limits provided for by the appropriation of $355,000 made by Congress in the act herein named, but no payment for such work done or material furnished after said date shall be made until Congress shall have extended the time for the completion of the work, unless the Secretary of War shall then determine that the time for completion under these articles of agreement may be extended, and shall thereupon expressly authorize payment to be made, in the usual manner, for the work done during the period of extension.

It is further understood and agreed that nothing herein contained shall be construed to release from, or add to, any obligation, liability, right, or duty involved in the original contract of October 29th, 1883, or any articles of agreement supplemental thereto, so far as concerns the parties in interest, except as specifically provided in these final supplemental articles now signed and dated this 8th day of May, 188-, which said final articles are to become operative only when approved by the Chief of Engineers, U. S. Army, and the Secretary of War.

In witness whereof the undersigned have hereunto placed their hands and seals the date first hereinbefore written.

G. J. LYDECKER, [SEAL.]
Maj. Eng., U. S. A.
BECKWITH & QUACKENBUSH. [SEAL.]

Witnesses:
SIMON NEWTON.
JOHN M. LASKEY.

Approved May 9, 1888.

J. C. DUANE,
Brig. Gen., Chief of Engineers.

[2nd indorsement.]

WAR DEPARTMENT,
May 10th, 1888.

Approved.

WM. C. ENDICOTT,
Secretary of War.

[Committee No. 31.]

List of executive documents on the subject of the Washington Aqueduct and the increased water supply of Washington, D. C.

1. H. Ex. Doc. 33, 2d sess., 31st Cong., Mch. 3, 1851. None on hand.
2. H. Ex. Doc. 82, 1st sess., 34th Cong., Apl. 11, 1856. None on hand.
3. S. Ex. Doc. 96, 2d sess., 41st Cong., June 6, 1870. None on hand.
4. S. Ex. Doc. 31, 3d sess., 41st Cong., Feb., 1871. None on hand.
5. H. Ex. Doc. 72, 1st sess., 44th Cong., Jan'y 18, 1876.
6. S. Mis. Doc. 48, 3d sess., 45th Cong., Jan'y, 1879. None on hand.
7. S. Mis. Doc. 55, 3d sess., 45th Cong., Feb. 4, 1879. None on hand.
8. S. Mis. Doc. 58, 3d sess., 45th Cong., Feb., 1879. None on hand.
9. S. Mis. Doc. 76, 3d sess., 45th Cong., Feb., 1879. None on hand.
   S. Report, No. 242, 1st sess., 47th Cong., March 9, '82.
10. Congressional Record, Feb. 27, 1879, p. 39.
    H. R. Ex. Doc. No. 39, 49th Congress.
    H. R. Rept., 3109, 49.
11. Congressional Record, May 18, 1880, p. 25
12. Congressional Record, May 23, 1880, p. 27.
13. Congressional Record, Dec. 17, 1880, p. 9.
14. S. Report 242, 1st sess., 47th Cong., March, 1882. None on hand.
15. Congressional Record, May 25, 1882, p. 15.
16. Congressional Record, June 14, 1882, pp. 24 and 25.
17. Congressional Record, June 13, 1882, pp. 32 and 33.

Send me all of above that are on file, one of each.

C. B. S.

Have none of Records; was informed by Mr. Williams that they were all sent to Willet's Point. Have but one of the above enumerated Docs.

Resp'y,

I. H. P.

[Committee No. 32.]

Par. 2, G. O. No. 186, A. G. O., Aug. 11, 1882, assigning Major G. J. Lydecker, Corps of Engineers, to charge of Washington Aqueduct and the extension thereof.

Special Orders, No. 186.

HEADQUARTERS OF THE ARMY,
ADJUTANT-GENERAL'S OFFICE,
Washington, August 11, 1882.

* * * * * * *

2. By direction of the Secretary of War Major Garret J. Lydecker, Corps of Engineers, is assigned, in addition to his present duties, to the charge of the Washington Aqueduct and the extension thereof provided for in the act approved July 15, 1882, and will relieve Lieutenant-Colonel Thomas L. Casey, Corps of Engineers, at his own request, of his present duties in connection with said aqueduct.

* * * * * * *

By command of General Sherman.

R. C. DRUM,
Adjutant-General.

[Committee No. 33.]

Copy of order issued from office of the Washington Aqueduct, January 3, 1884, assigning Lieut. Thos. W. Symons to duty as supervising engineer of the Washington Aqueduct and the extension thereof.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., January 3, 1884.

Order.

First Lieut. Thomas W. Symons, Corps of Engineers, having by direction of the Secretary of War, reported to the undersigned for duty upon the Washington Aqueduct and the extension thereof, is hereby assigned as superintendent engineer on the

work, and as such will assume control of all active operations relating thereto. He will be obeyed and respected accordingly, and to that end all employés will report to and receive instructions from him direct.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 34.]

Copy of order issued from office of the Washington Aqueduct, May 5, 1887, assigning Lieut. C. McD. Townsend, as supervising engineer of all matters connected with increasing water supply of Washington, D. C.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., May 5, 1887.

Orders.

First Lieut. C. McD. Townsend, Corps of Engineers, U. S. A., having, by direction of the Secretary of War, reported for duty to the undersigned, is hereby assigned as the supervising engineer of all operations connected with increasing the water supply of Washington, D. C., and he will be obeyed and respected accordingly. All communications and reports concerning the operations herein indicated will hereafter be addressed to Lieutenant Townsend.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee, No. 35.]

The name and address of each of the officers who has had any duty to perform in respect of the work, or in respect of any other plans or estimates, touching the subject; and, so far as the present work is concerned, a statement of the time each officer was employed therein, the nature of his duties, and the degree of his control in the matter.

The "superintendence of the Washington Aqueduct" as now held by the Chief of Engineers was assigned him by the act of March 2, 1867, sec. 2 (Statutes at Large, vol. 14, p. 466).

On the 13th of March, 1867, the Chief of Engineers was ordered by the Secretary of War (copy inclosed marked A1) to assign a competent engineer officer to the superintendence of the Washington Aqueduct, and in obedience to that order Major N. Michler, Corps of Engineers, was so assigned March 13, 1867.

From the above dates the succession of Chiefs of Engineers has been as follows:

	From—	To—	Address.
Gen. A. A. Humphrey	March 2, 1867	June 30, 1879	Died Dec. 27, 1883.
Gen. H. G. Wright	June 30, 1879	March 6, 1884	1203 N St., N. W., Washington, D. C.
Gen. John Newton	March 6, 1884	Aug. 27, 1886	New York City.
Col. J. G. Parke (in charge of office).	Aug. 30, 1886	Oct. 14, 1886	West Point.
Gen. J. C. Duane	Oct. 14, 1886	June 30, 1888	New York City.
Maj. J. C. Post (in charge of office).	June 30, 1888	July 23, 1888	Washington, D. C.
Gen. T. L. Casey	July 23, 1888	To date	Washington, D. C.

The assistants to the Chief of Engineers in his office in general matters pertaining to Washington Aqueduct.

	From—	To—	Address.
Lt. Col. J. C. Woodruff	March 2, 1867	June 1, 1868	Died Dec. 10, 1878.
Maj. J. G. Parke	June 1, 1868	June 30, 1887	West Point, N. Y.
Maj. J. C. Post	June 30, 1887	Oct. 6, 1888	Washington, D. C.
Capt. C. B. Sears	Oct. 6, 1888	To date	Washington, D. C.

The assistants to the Chief of Engineers in his office in matters pertaining to the settlement of accounts of the Washington Aqueduct.

	From—	To—	Address.
Maj. W. P. Craighill	March 2, 1867	Feb. 7, 1870	Baltimore, Md.
Maj. J. B. Wheeler	Febv. 7, 1870	Oct. 10, 1871	Died July 15, 1886.
Maj. T. L. Casey	Oct. 10, 1871	May 14, 1872	Washington, D. C.
Lt. Col. J. G. Foster	May 14, 1872	June 1, 1874	Died Sept. 2, 1874.
Maj. G. H. Elliot	June 1, 1874	Janv. 2, 1879	Montreux, Switzerland. (On sick leave.)
Capt. H. M. Adams	Janv. 2, 1879	April 9, 1887	Washington, D. C.
Capt. T. Turtle	April 9, 1887	To date	Washington, D. C.

Officers of the Corps of Engineers who have been assigned to the immediate charge of the Washington Aqueduct under the Chief of Engineers.

	From—	To—	Address.
Maj. N. Michler	Mar. 13, 1867	Nov. 15, 1870	Died July 17, 1884.
Maj. G. H. Elliot	Nov. 15, 1870	Oct. 13, 1871	Montreux, Switzerland (on sick leave).
Maj. O. E. Babcock	Oct. 13, 1871	Mar. 13, 1877	Died June 2, 1884.
Lt. Col. T. L. Casey	Mar. 3, 1877	Aug. 12, 1882	Washington, D. C.
Maj. G. J. Lydecker	Aug. 12, 1882	To date	Washington, D. C.

Officers of the Corps of Engineers who have been assistants to the officer in immediate charge of the Washington Aqueduct.

	From—	To—	Address.
Capt. R. L. Hoxie	Aug. 11, 1882	Aug. 16, 1884	Montgomery, Ala.
Capt. T. W. Symons	Dec. 15, 1883	June 5, 1886	Washington, D. C.
Lieut. C. McD. Townsend	May 4, 1887	To date	Washington, D. C.

Civil engineers who have acted as assistants to the officer in immediate charge of the Washington Aqueduct.

	From—	To—	Address.
Theodore B. Samo	Mar. 13, 1867	July 3, 1882	Died July 3, 1882.
John A. Partridge	Nov. 16, 1883	Mar. 31, 1888	Washington, D. C., 509 6th street N. W.
S. B. Merrill	Jan. 1, 1884	Oct. 11, 1884	Unknown.
R. D. Carpenter	Mar. 19, 1884	Mar. 31, 1884	Unknown.
George H. Coryell	Oct. 12, 1884	Feb. 15, 1888	Washington, D. C., 1140 Connecticut ave.
Raphael C. Smead	May 20, 1885	Feb. 15, 1887	Washington, D. C., 2817 Q street.
Benjamin N. Bailey	June 7, 1886	To date	Office Washington Aqueduct.

The annual reports of the several engineer officers in immediate charge of the Washington Aqueduct will be found in the reports of the Chief of Engineers (President's message and accompanying documents) for the several years in question, namely:

1867, Maj. N. Michler in charge, Report of Chief of Eng'rs, pages 530, 548.
1868, Maj. N. Michler in charge, Report of Chief of Eng'rs, page 904.
1869, Maj. N. Michler in charge, Report of Chief of Eng'rs, page 502.
1870, Maj. N. Michler in charge, Report of Chief of Eng'rs, page 522.
1871, Maj. G. H. Elliot in charge, Report of Chief of Eng'rs, page 948.
1872, Maj. O. E. Babcock in charge, Report of Chief of Eng'rs, page 1019.
1873, Maj. O. E. Babcock in charge, Report of Chief of Eng'rs, page 1162.
1874, Maj. O. E. Babcock in charge, Report of Chief of Eng'rs, Part II, page 397.
1875, Maj. O. E. Babcock in charge, Report of Chief of Eng'rs, Part II, page 814.
1876, Maj. O. E. Babcock in charge, Report of Chief of Eng'rs, Part II, page 691.
1877 (part), Maj. O. E. Babcock in charge, Report of Chief of Eng'rs, Part II, page 1067.
1877 (part), Lt. Col. T. L. Casey in charge, Report of Chief of Eng'rs, Part II, page 1089.

1878 (part), Lt. Col. T. L. Casey in charge, Report of Chief of Eng'rs, Part II, page 1350.

1879, Lt. Col. T. L. Casey in charge, Report of Chief of Eng'rs, Part II, page 1865.

1880, Lt. Col. T. L. Casey in charge, Report of Chief of Eng'rs, Part III, page 2344.

1881, Lt. Col. T. L. Casey in charge, Report of Chief of Eng'rs, Part III, page 2703.

1882, Lt. Col. T. L. Casey in charge, Report of Chief of Eng'rs, Part III, page 2729.

1883, Maj. G. J. Lydecker in charge, Report of Chief of Eng'rs, Part III, pages 2027-2080.

1884, Maj. G. J. Lydecker in charge, Report of Chief of Eng'rs, Part III, pages 2299-2301.

1885, Maj. G. J. Lydecker in charge, Report of Chief of Eng'rs, Part III, pages 2453-2469.

1886, Maj. G. J. Lydecker in charge, Report of Chief of Eng'rs, Part III, pages 2013-2021, 2043.

1887, Maj. G. J. Lydecker in charge, Report of Chief of Eng'rs, Part IV, pages 2527-2535.

1888, Maj. G. J. Lydecker in charge, Report of Chief of Eng'rs, Part IV, pages 2749-2755.

While in almost all of the annual reports of the officer in charge of the Washington Aqueduct prior to 1879 the deficient supply of water to the city of Washington is referred to, it is believed the inception of the present efforts to increase the water supply is to be found in the resolution of the Senate of January 17, 1879. This resolution was sent to the engineer officer in charge of the Washington Aqueduct January 20, 1879, by the chairman of the Senate Committee District of Columbia, requesting his views on the subject contained therein, and the answer of this officer, dated January 22, 1879, is to be found in Mis. Doc., No. 43, Senate, 45th Congress, 3d session.

On July 30, 1879, Senator I. G. Harris, chairman Committee District of Columbia, addressed a letter to the officer in charge of the Washington Aqueduct. (Copy herewith, marked A 2.)

The answer of this officer is to be found in Appendix NN 2, Report of the Chief of Engineers for 1880, page 2358.

The first report of Senator Harris upon the increased water supply is to be found in Report No. 39, Senate, 46th Congress, 2d session.

On February 9, 1882, Senator Harris addressed a letter to the officer in charge of the Washington Aqueduct. (Copy herewith, marked A 3.)

The answer of this officer, dated February 10, 1882, is herewith. (Copy, marked A 4.)

On the 24th of February, 1882, Senator Harris, chairman of Committee on District Columbia, addressed a letter to the engineer officer in charge of the Washington Aqueduct. (Copy herewith, marked A 5.)

The answer of this officer is contained in my letter of February 24, 1882. (Copy herewith, marked A 6.)

The second report of Senator Harris upon the increased water supply is to be found in Report No. 242, Senate, 47th Congress, 1st session.

The act for the increased water supply was passed July 15, 1882.

The nature of the duties of each officer employed and the degree of his control are set forth at large in the Regulations of the Corps of Engineers. (Regulations of the Army, paragraphs 2473 to 2500, inclusive.)

To particularize, the Chief of Engineers, as a general rule, designates the officer to be placed in immediate charge of a work. He approves or forwards to the Secretary of War, with his views, any plan or project of work which may have been made by the officer in charge, or which may have been conceived, suggested, or amended by a board of engineers charged with the duty. He forwards to the Secretary of War requests of the officer in charge for funds to be placed to his credit. He determines under recommendation of the officer in charge to whom contracts shall be awarded. He approves or disapproves the contracts after they are executed.

He receives from the officer in charge monthly reports of operations and return of officers and men employed. His authority is required for the employment of certain persons and the purchase of certain articles used in the work. (Paragraph 2487, Engineer Regulations.)

He examines the accounts of the officer in charge of a work and transmits them to the Treasury with his action upon them.

He inspects from time to time or has the works inspected by officers of the corps.

The officer in charge of a work is concerned in its actual execution and is to see that it is done in accordance with the approved projects or plans.

He is held responsible in the Treasury and by his superior officers for the legal expenditure of the funds appropriated by Congress. He obtains his authority from and makes report of his doings to the Chief of Engineers.

An assistant to the officer in charge is to do such things as his superior may order him to do, and is responsible to him for the proper performance of this duty.

[Committee No. 36.]

The Secretary of War directs the Chief of Engineers to assign an officer of Engineers to charge of Public Buildings and Grounds and of Washington Aqueduct.

WAR DEPARTMENT,
ADJUTANT-GENERAL'S OFFICE,
Washington City, March 13th, 1867.

Brevet Major-General A. A. HUMPHREYS,
Chief of Engineers:

SIR: By the second section of the "Act making appropriations for sundry civil expenses of the Government, for the year ending June thirtieth, eighteen hundred and sixty-eight, and for other purposes," approved March 2, 1867, it is enacted as follows: "That the office of Commissioner of Public Buildings is hereby abolished, and the Chief Engineer of the Army shall perform all the duties now required by law of said Commissioner, and shall also have the superintendence of the Washington Aqueduct and all the public works and improvements of the Government of the United States in the District of Columbia, unless otherwise provided by law; and the Sergeant-at-Arms of the Senate and the Sergeant-at-Arms of the House of Representatives shall hereafter appoint the members of the Capitol police."

By the foregoing section the duties heretofore imposed by law upon the Commissioner of Public Buildings are devolved upon your Bureau. You will assign a competent Engineer officer to perform the same, who shall have the superintendence of the Washington Aqueduct and all the public works and improvements of the United States in the District of Columbia not otherwise provided by law. You will issue an order to the officer so assigned, directing him at once to enter upon the performance of his duties and report to you from time to time for orders.

You will give notice of such assignment to the Secretary of the Interior, and direct the officer assigned to receive from the Secretary of the Interior and the late Commissioner of Public Buildings all the books, records, archives, and papers pertaining to the office of Commissioner of Public Buildings, and safely keep the same, taking an inventory thereof to be filed in the Bureau of Engineers.

By order of the Secretary of War.

E. D. TOWNSEND,
Asst. Adjt. Genl.

[Committee No. 37.]

Information requested by the Committee on the District of Columbia.

COMMITTEE ON THE DISTRICT OF COLUMBIA,
UNITED STATES SENATE,
Washington, D. C., July 30, 1870.

SIR: I am directed by Senator Isham G. Harris, chairman Committee on District of Columbia, to transmit to you copy of the resolution adopted by the Senate June 6th, 1870, which please find enclosed herewith; and to respectfully request you will cause to be furnished to the committee such information upon the points to which inquiry is directed by the terms of the resolution as is to be obtained from the records of your office.

Your entire familiarity with the subject will doubtless enable you to offer to the committee suggestions of the utmost value, as well as accurate information as to what additional expenditures of money will be required to furnish (1) an ample supply of water; and (2) to render the same as pure as possible. And the committee will be greatly obliged to you for such suggestions and information.

As the subcommittee to whom the subject has been referred will convene on or before the 1st of September next to consider the same and prepare a report thereupon, it is earnestly hoped you will find it convenient to favor the committee, through its chairman, with an early reply.

Very respectfully,

CHARLES STONE,
Clk. Com. Dist. Col. U. S. S.

To Col. THOMAS L. CASEY, U. S. A.,
Comm'r Public Buildings, &c., Washington, D. C.

Resolved, That the Committee on the District of Columbia be, and
thorized to sit during the next recess of the Senate, to investigate the
securing to the cities of Washington and Georgetown an ample supply o
and to ascertain what the water-works now in use, including the aq
voirs, water-mains, &c., have cost the United States, the District of C
the cities of Washington and Georgetown; and also the annual income
secured therefrom, and how much thereof has been realized; and als
state of all outstanding debts or liabilities relating to said works; an
tional expenditure will be necessary, if any, to secure an ample supply o
and that the committee report to the Senate, by bill or otherwise, at the
of Congress.

Adopted June 6, 1879.

[Committee No. 38.]

Senator Harris to Col. Thos. L. Casey, Corps of Engineers, as to any chang
for conduit for water supply since those of 1879.

COMMITTEE ON THE DISTRICT OF COLUMB
UNITED STATES S
Washington, D. C., Fe

Col. THOS. L. CASEY,
Washington, D. C.:

SIR: As chairman of the subcommittee of the Com. on the Dist. of
whom has been referred the question of the additional water supply fo
Washington and Georgetown, I desire to know if the estimates of cost
the conduit and making the necessary main connections submitted by y
me as chairman of the then subcommittee have changed; and, if so, to

I would be glad to receive from you any suggestions which you may
make in respect to the question of the water supply.

Resp'y yours,

ISHAM

[Committee No. 39.]

Colonel Casey in answer to letter of 9th instant.

ENGINEER'S OFFICE, WASHINGTON AQU
Washington, D. C., Fe

Hon. ISHAM G. HARRIS,
Chairman of Subcommittee, Committee on the District of Columbia, Se

SIR: I have the honor to acknowledge the receipt of your note of the
ing "if the estimates of cost of extending the conduit and making the ne
connections submitted by you in 1879 * * * have changed, and, i
extent," and in reply to state:

That there must be some mistake in the records on this matter, as the
has never made a survey or estimate for *extending the conduit*, and th
made by me to the committee of which you were chairman is dated Augu
herewith inclosed (page 2358). What is stated in this report by me wil
page ——, marked in the margin.

I would make no change in what is here stated, other than if another
laid it had better be 48 inches in diameter, and follow the highest groun
laid on between Rock Creek Bridge and Capitol Hill, using it as a supp
to space along the line. Its cost would be about $20 per running foot i

I would also beg leave to call your attention to the remarks in my a
for the past year upon the dam at the Great Falls, and the necessity fo
tion at an early day. See Appendix Q Q, inclosed, page 2707.

Very respectfully, your obdt. servant,

THOS. LINCOLN
Lt. Col., Corps of Engineers, in charge of Washingto

[Committee No. 40.]

Senator Harris to Colonel Casey, asking for further information concerning the water supply.

COMMITTEE ON THE DISTRICT OF COLUMBIA,
UNITED STATES SENATE,
Washington, D. C., Feb'y 24, 1882.

Col. THOS. LINCOLN CASEY,
City:

SIR: As chairman of the subcommittee on the question of the water supply of the city, I desire to submit to you the following inquiries relative thereto, as information necessary on which to base our report:

1. If the aqueduct is extended to 10th and Boundary sts., can the evil of inadequate supply on the higher levels be remedied by main connections?
2. What will be the cost of extending the aqueduct to the high ground at or near 10th and Boundary sts., and the cost of necessary main connections from that point?
3. What will be the cost of extending the aqueduct to or near Sixth st. extended, with necessary main connections from that point?
4. Which of these plans will most effectually remedy the evil of inadequate supply upon the higher levels?
5. Is the extension of the aqueduct necessary at this time to supply the higher, as well as the medium (?) and lower levels?
6. Is it necessary to increase the height of dam at Great Falls, and to extend the same to the Virginia shore, and if so at what cost? And what will be the cost involved in protecting the Chesapeake and Ohio Canal from damage consequent upon such heightening and extension of dam?
7. If the aqueduct is extended, as suggested, to 10th and Boundary sts., or near 6th st. extended, what quantity of water will be delivered daily?
8. Should the main be constructed of cast or boiler iron, and what will be the difference in cost?

I should be pleased to receive your reply at your very early convenience.

Respectfully,

ISHAM G. HARRIS,
Ch'm'n Subcomm'ee of Comm'ee on D. C.

[Committee No. 41.]

Colonel Casey to Senator Harris, in reply to letter of even date.

ENGINEER'S OFFICE, WASHINGTON AQUEDUCT,
Washington, D. C., Feb. 24, 1882.

Hon. ISHAM G. HARRIS,
Chairman Subcommittee of Committee on District of Columbia,
No. 515 *11th Street, N. W.:*

SIR: Referring to your letter of this date, sent to Major Twining and myself, containing certain interrogatories concerning the water supply to this city, the sixth question only has been taken up in this office, as the data for replying to it is of file here. It is as follows:

"Is it necessary to increase the height of dam at Great Falls, and to extend the same to Virginia shore; and if so, at what cost, and what will be the cost involved in protecting the Chesapeake and Ohio Canal from damage consequent upon such heightening and extension of dam?"

The object of the aqueduct dam at the Great Falls is to create a pool or lake, the surface of which shall not be lower than the top of the dam, and shall be of sufficient head to enable the quantity of water used daily in the city of Washington to flow through the conduit to the distributing reservoir just outside of Georgetown. The quantity of water taken daily in the city, at this time, is about 27,000,000 of gallons, and to furnish this quantity daily from the distributing reservoir, through the mains and at the greatest head the reservoir is capable of giving, requires the water level in the reservoir to stand at 146 feet above datum. To supply the distributing reservoir kept at this level with the same quantity, daily, from the pool at the Great Falls, requires the water in the pool to stand at 147.66 above datum. For two hundred and fifty-seven days during the past year the water above the present dam at the Great Falls was below this level (147.66), and consequently the level of the water in the distributing reservoir could not be kept at the best level for the distribution of the water to the city, but fell below the proper level. The present dam should therefore be finished to the Virginia shore, in order to create a pool of water of suf-

ficient head to send through the conduit at all times the quantity required. This is independent of any increased facilities for bringing more water from the distributing reservoir to the city, to which the other interrogatories refer, and the certain and efficient service of the present mains requires the completion of the dam to the Virginia shore.

The dam now in place at the Great Falls reaches from the Maryland shore to the east of Conn's Island. It is a cut-stone dam, only partly finished, lies obliquely to the thread of the current, its down-stream end being on the Maryland shore, and is 1,260 feet in length. Its top is at 146.8 feet above the datum plane. To finish the part commenced to the level of 148 feet, carry it in about the same direction and at the same level across Conn's Island and to the Virginia shore, will require an addition to its length of 1,740 feet, making its total length 3,000 feet.

The estimated cost of the completion of this dam to the level of 148 feet only is as follows:

5,510	cubic	yards	of excavation, at $1	$5,510
4,891	"	"	cut-stone masonry, at $23.50	114,939
8,298	"	"	rip-raps, at $2	16,596
1,351	"	"	coping (additional), at $6	8,106
				145,151

This dam, at the low stages of the river, will be an overfall dam, the water passing above its crest at a depth of five or six inches. At the high stages of the river it will be entirely submerged, and its effect will be to raise the waters of a flood just above its crest, some 3.2 feet higher than the water would rise if the dam had not been built. The increased quantity of water that would then be thrown into the prism of the Chesapeake and Ohio Canal can be kept back in the river by raising the tow-path of the canal, from lock No. 20 to lock No. 21, a distance of 12,300 feet. The necessary embankment for this purpose, without ripraps, could be made for $10,000. With ripraps and a short embankment on the berm side at lock No. 20, a sum of $12,300 would be sufficient. This would cover the cost of the works necessary to keep back, for the prism of the canal in times of freshets, the additional body of water raised by the dam.

It is not known what would be the cost of the site of the dam across Conn's Island.

Very respectfully, your obedient servant,

THOS. LINCOLN CASEY,
Lt. Col., Corps of Engineers, in charge of Washington Aqueduct.

[Committee No. 42.]

Report of Major Lydecker relative to employment and selection of assistant engineers, inspectors, etc.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., November 1, 1888.

The CHIEF OF ENGINEERS, U. S. ARMY,
Washington, D. C.:

GENERAL: I have the honor to submit the report below, in obedience to instructions contained in a letter from the Engineer Department, dated October 31st, 1888, calling upon me for the following information, viz: "A statement of the methods employed in the selection of assistant engineers from civil life, and of inspectors and subinspectors connected with the work, and what tests, if any, in respect of their fitness and capacity were made."

The assistant engineers from civil life who have been employed on the works have been selected by the U. S. engineers in immediate charge, on such recommendations as to capacity and honesty as would justify them in giving the applicant or party selected a trial. Those who were in this way found to be properly qualified were retained on the work as long as their services were needed and satisfactory. Inspectors and subinspectors were selected in a similar manner. The only test of fitness and capacity was in the service after appointment, but diligent inquiry was always made in advance in order to avoid, so far as possible, the appointment of anybody who was unfit. In the majority of cases the person appointed was obtained only after inquiry and search for one suited to the position in question. It was not, in general, a case of selecting from several applicants, but of hunting up the right man for the place.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 43.]

Major Lydecker submits bids for furnishing cast-iron water-pipes and special castings.

OFFICE OF WASHINGTON AQUEDUCT,
Washington, D. C., September 7, 1883.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A., Washington, D. C.:

GENERAL: I have the honor to transmit herewith abstract of proposals for furnishing cast-iron water pipes and special castings for increasing the water supply of Washington, D. C., received and opened by me on the 4th inst. A copy of each proposal received is also enclosed.

Andrew H. McNeal, of Burlington, N. J., is the lowest responsible bidder for 48", 12", 8" and 6" pipe and special castings, and I recommend the contract for these items be awarded to him; the amount included in this part aggregates 2,489 tons, at a total cost of $88,192.

The lowest bidder for the 75" pipe is H. A. Ramsay, of Baltimore, at $44.95 per ton, but his bid is so informal that I recommend its rejection; only one copy of bid is presented, whereas triplicates are called for, the prices are not written out, and the bidder's bond is ignored entirely.

The next lowest bidder on this item, is Walter Wood, of Philadelphia, Pa., who bids $50 per ton for the pipe "not dipped nor proved," as required by the specifications; this is a material consideration and I therefore recommend the rejection of this bid.

The next lowest, and the lowest satisfying the advertised conditions on this item, is the West Point Foundry Association of Cold Springs, N. Y., and I recommend the award of the contract for the 75" pipe to this bidder; the amount involved is about 115 tons at $52.50, $23,362.50. Neither this bid nor that previously referred to includes the special castings for the 75" pipe, but this is a small matter that can readily be arranged hereafter without reference to the awards herein recommended, which aggregate in value $111,555; the cost of the special castings will be about $2,500.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 44.]

Abstract of proposals for furnishing cast-iron water-pipes and special castings for increasing the water supply of Washington, D. C., received and opened at office of the Washington Aqueduct September 4th, 1883.

[Per gross ton of 2,240 lbs.]

No.	Name.	Residence.	445 tons 75".	2,383 tons 48".	41 tons 12".	59 tons 8".	6 tons 6".
1	Walter Wood	Philadelphia, Pa.	*a50.00	36.70	41.75	42 90	43.50
2	Andrew H. McNeal	Burlington, N. J.	*b* 75.00	35.20	40.00	41.00	42.00
3	Gloucester Iron Works	Philadelphia, Pa.	.....	45.00	42.39	43.00	44.80
4	West Point Foundry Ass'n	Cold Springs, N. Y.	*52.50	.....	.....	.....	.....
5	Builders' Iron Foundry	Providence, R. I.	*c*69.00	.....	.....	.....	.....
6	H. A. Ramsey	Baltimore, Md	44.95	.....	.....	.....	.....

*No bid for special castings.
a Coated, but not dipped nor proved.
b Omitting hydraulic test, $55.00.
c Omitting hydraulic test, $66.00. (Informal; only one proposal received; no bidder's bond.)

Respectfully submitted.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 45.]

Advertisement, instructions, specifications, proposals, and bidder's bond, for cast-iron water-pipes and special castings for increasing the water supply of Washington, D. C.

[Advertisement.]

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., August 8, 1883.

Sealed proposals, in triplicate, will be received at this office until 12 o'clock noon on Tuesday, September 4, 1883, for furnishing three thousand (3,000) tons, more or less, of cast-iron water pipes and special castings for the same.

The iron pipe will include 680 lineal feet, 75 inches internal diameter; 6,700 lineal feet, 48 inches internal diameter; 1,060 lineal feet, 12 inches internal diameter; 2,650 lineal feet, 8 inches internal diameter; 420 lineal feet, 6 inches internal diameter.

For specifications, blanks on which bids must be made, and all other information, apply at this office.

G. J. LYDECKER,
Major of Engineers, U. S. A.

General instructions for bidders.

1. All proposals must be in triplicate, on the accompanying form. They must be enclosed in a sealed envelope and endorsed "Proposals for cast-iron water-pipes and special castings." This parcel should then be placed inside a second envelope, and be addressed to *Office of the Washington Aqueduct, Georgetown Station, Washington, D. C.* No responsibility shall attach to the officer in charge for the premature opening of any proposal not endorsed as above directed.

2. The bidder's bond—executed in triplicate—must be signed by two (2) responsible sureties in the sum of twenty thousand dollars ($20,000), to be certified to as good and sufficient sureties by a United States district attorney, collector of customs, or any other officer under the United States Government, or responsible person known to this office.

3. A firm will not be accepted as a surety, nor will a partner be accepted as surety for a copartner or for a firm of which he is a member.

4. An officer of a corporation will not be accepted as surety for such corporation.

5. Where firms bid, the individual names of the members should be written out, and should be signed in full, giving the Christian names; but the signers may, if they choose, describe themselves in addition as doing business under a given name and style as a firm.

6. Signatures of obligor and sureties to bidder's bond must have affixed to them seals of wax or wafer.

7. The place of residence of every bidder, with county and State, must be given after his signature, which must be written in full.

8. Any one signing a proposal as the agent of another, or of others, must file with it legal evidence of his authority so to do.

9. Alterations by erasures or interlineations should be explained or noted in the proposal over the signature of the bidder.

10. If a bidder wishes to withdraw his proposal, he may do so before the time fixed for the opening, without prejudice to himself, by communicating his purpose in writing to the officer who holds it, and when his proposal is reached it will be handed to him or his authorized agent unread.

11. All prices must be written as well as expressed in figures

12. The contract which the bidder promises to enter into shall be in the form adopted and in use by the Engineer Department of the Army, blank forms of which can be inspected at this office. Parties making bids are to be understood as accepting the terms and conditions contained in such form of contract.

13. Reasonable grounds for supposing that any bidder is interested in more than one bid for the same item will cause the rejection of all bids in which he is interested.

14. The United States reserves the right to reject any and all bids; also to disregard the bid of any *failing bidder or contractor*, known as such to the Engineer Department.

15. The bidder must satisfy the United States engineer in charge of his ability to furnish the materials or perform the work for which he bids.

16. Transfers of contracts or of interests in contracts are prohibited by law.

17. Bidders are invited to be present at the opening of the bids.

SPECIFICATIONS.

1. The work to be done consists in furnishing and delivering the following pipe and castings, aggregating about three thousand (3,000) tons. But the right is reserved to

award contracts for whole amount, or by items, in the following bill, as in the opinion of the United States engineer may best serve the interest of the Government, and bids for the whole or any part will be considered.

Bill of materials.

Number of feet laid.	Inside diameter.	Thickness in inches.	Joint room in inches.	Weight per ft. in pounds.	Weight of each section.	Total weight.	Permitted deviation in weight.
	Inches.						*Per cent.*
680	75	2	(*)	1,575	19,179	1,086,640	2
6,700	48	1¼	5–10	775	9,560	5,337,622	2½
1,060	12	67–100	5–10	85	1,048	92,569	3
2,650	8	55–100	4–10	47	600	132,500	3½
420	6	48–100	4–10	32	395	13,860	4

* See drawings.

The quantities indicated in the above bill are to be considered approximate only, and the United States hold the right to increase or diminish the same, not exceeding twenty (20) per cent. of the above amounts.

2. Pipes and castings shall be delivered on either of the wharves in the District of Columbia, or on the cars at either railroad depot in the city of Washington, as ordered by the United States engineer. The contractor shall send with each shipment a schedule, giving the number and weight of each pipe and special casting sent at that time.

3. Every pipe shall have cast upon it, in letters from two (2) to two and one-half (2½) inches long and one-eighth (⅛) inch relief, the initials of the maker's name, the year in which it is cast, and the number, in regular series, in point of time of its casting, thus: A, B, C, 1883—1; A, B, C, 1883—2, etc.; each size of pipe to have its own series of numbering. Special castings shall have similarly the maker's initials, year of casting, and serial number.

4. Straight pipe must be made of such length as to lay at least twelve (12) feet; in each section they shall be made with hub and spigot joint, which, together with all branches and special castings, shall accurately conform in shape and dimensions to the drawings furnished by the United States engineer and his instructions, from time to time. No pipes or castings will be accepted which are defective in joint room from any cause. Lugs shall be cast on any or all connections and special castings, as may be ordered by the United States engineer. No pipes will be received that are more than the permitted deviation below the specified weights. For any excess above the deviation allowed no payments will be made.

5. The metal shall be such as to afford the best quality of cast-iron pipe—strong, tough, and of sound, even grain, and such as will satisfactorily admit of cutting and drilling.

6. All pipes shall be cast vertically, with hub-end down. They shall be free from all defects and imperfections. They shall be truly cylindrical in the bore, with the inner and outer surfaces concentric; straight in the axis for straight pipe, and true to the required curvature or form in the axis of the other pipes, and shall be internally and externally of the full specified dimensions.

7. The pipes and castings shall be carefully cleaned, without the use of acids or liquids, and then subjected to a careful hammer inspection; they shall then be thoroughly coated while at a temperature of 300° F. with a preparation of coal-pitch varnish, which shall be of such character as shall make a smooth coating, tough, and tenacious when cold, and not brittle or with a tendency to scale off.

8. Each pipe or casting shall remain in the bath at least thirty (30) minutes, and until the pipe or casting and pitch have an entirely equal temperature of the degree ordered by the United States engineer.

9. After being carefully drained of surplus pitch, they shall, in the presence of an inspector, to be appointed by the United States engineer in charge, be subjected to a hydraulic pressure or three hundred (300) pounds per square inch and to a hammer inspection while under this pressure, and, if the United States Engineer so determine, they shall be further subjected to a similar test after their delivery on the work and before a final acceptance.

10. The pipes and castings shall be weighed for payment after the application of the coal pitch, and the weight shall be painted conspicuously in white on the outside. If the United States engineer shall so decide, the pipes and castings shall be weighed after delivery in Washington, and the weights so ascertained shall be used in the final settlement of the contract. The ton used shall be the gross ton of twenty-two hundred and forty (2,240) pounds.

11. All tools, materials, men, and expenses necessary for the proper manufacture, inspection, and weighing in the shops, and for the delivery of the pipes and castings as hereinbefore required, shall be furnished by and at the cost of the contractor, not including, however, the salary of the inspector appointed by the United States engineer, for any part of the period covered by the contract; but if the services of this inspector should be required for a longer period, because of default on the part of the contractor, his salary for such additional time will be deducted from any amount that may be, or become, due said contractor.

12. The whole process of the manufacture of the pipes and castings shall be open at all times to the inspection of the United States engineer. Specimen casting of the metal used, suitable for a testing-machine, shall be made when desired by him, and such castings must bear a tensile strain of sixteen thousand (16,000) pounds per square inch. He shall have power to prevent the use of any metal, mould, or core, which in his opinion may not be proper for the purpose for which it is intended; he shall inspect and approve, or reject, the process of cleaning or testing the pipes, the preparation and application of the pitch varnish; and, in general, the form, size, uniformity, and condition of all pipes. On all these questions the decision of the United States engineer shall be final, and he may further reject, without proving, any casting which is not in conformity with the specifications and drawings furnished.

13. All pipes and castings contracted for must be finally found in all respects sound and conformable to the foregoing requirements. The several inspections will not relieve the contractor of any of his obligations in this respect, and any defective pipes, or other castings, which may have passed inspection at the foundery, or elsewhere, will be at all times liable to rejection when discovered, until the final adjustment and completion of the contract.

14. The delivery of the pipe and castings shall commence on or before the 1st day of October, 1883, and shall continue at an uniform rate untill the 31st day of December, 1883, when the delivery of the entire amount under each and every contract shall be completed. The various sizes, classes, and special castings shall be delivered in such order and at such times as may be required by the United States engineer.

15. Payments will be made on or before the tenth day of each month for all pipes and castings received and accepted in proper order and condition and in accordance with these specifications during the previous calendar month, less twenty (20) per cent. of the amount found due, to be reserved until the satisfactory completion of the contract.

16. To prevent disputes and litigation it is expressly understood that the decisions of the United States engineer shall be final as to the acceptance or rejection of any pipe or casting delivered on the work, and that he shall decide as to the meaning and intent of these specifications, or any obscurity in the wording of them; and, further, that he shall have the right to correct any errors or omissions in them necessary for the proper fulfillment of their intention; the action of such correction to date from the time that the United States engineer gives due notice thereof.

17. The prices bid must cover the entire cost to the United States for the pipes and castings finally accepted under the provisions of these specifications; and for any extra work or change due to any alteration or correction in said specifications the fair price to be paid shall be determined by the United States engineer, and stated in writing by him at the time such extra work or change is ordered, otherwise no claim for any payment above the regular contract price will be allowed, nor will any claim for extra work be admitted if such work shall have been done without a written order from the United States engineer antedating the execution of the same.

18. Wherever the words United States engineer are used, they refer as well to his authorized agents limited to the particular duties intrusted to them in writing.

PROPOSAL.

PHILAD'A, 9, 3, 1883.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

SIR: In accordance with your advertisement of August 8, 1883, inviting proposals for cast-iron water-pipes and special castings for increasing the water supply of Washington, D. C., and subject to all the conditions and requirements thereof, and of your specifications of the same date, copies of both of which are hereto attached, and, so far as they relate to this proposal, are made a part of it, we (or I) propose to furnish the pipe and castings at the following prices, viz:

For seventy-five (75) inch cast-iron water-pipes, coated but not lripped nor proved, at fifty (50) dollars per ton.

For forty-eight (48) inch cast-iron water-pipes, including special castings, at thirty-six (36) dollars and seventy (70) cents per ton.

For twelve (12) inch cast-iron water-pipes, including special castings, at forty-one (41) dollars and seventy-five (75) cents per ton.

For eight (8) inch cast-iron water-pipes, including special castings, at forty-two (42) dollars and ninety (90) cents per ton.

For six (6) inch cast-iron water-pipes, including special castings, at forty-three (43) dollars and fifty (50) cents per ton.

We (or I) make this proposal with a full knowledge of the kind, quantity, and quality of the pipes and castings required, and, if it is accepted, will, after receiving written notice of such acceptance, enter into contract within ten (10) days, with good and sufficient sureties for the faithful performance thereof.

WALTER WOOD,
Philadelphia, Pennsylvania.

In case of a firm, add names of partners.
(Signed in triplicate.)

Bidder's bond.

Know all men by these presents, that we, Walter Wood, of Philad'a, Pa., as principal, and S. R. C. Mathews, of Philad'a, Pa., and H. P. Kremer, of Philad'a, Pa., as sureties, are held and bound unto the United States of America in the penal sum of twenty thousand dollars ($20,000), to the payment of which sum, well and truly to be made, we do bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents.

Given under our hands and seals this thirtieth day of August, 1883.

The condition of this obligation is such that, whereas the above bounden Walter Wood, in response to a public advertisement and notice, dated August 8, 1883, and given and published by Major G. J. Lydecker, Corps of Engineers, United States Army, has made and presented to Major G. J. Lydecker, Corps of Engineers, United States Army, a formal proposal, in writing, whereby he has proposed and agreed to enter into a contract with Major G. J. Lydecker, Corps of Engineers, United States Army, for furnishing cast-iron water-pipes and special castings, according to the terms and conditions set forth in said advertisement and notice;

Now, therefore, if the said Walter Wood shall not withdraw his said proposal within sixty days from the date of opening the proposals, and shall within ten days from the date on which he may be notified that his said proposal has been accepted, and the said contract awarded to him (provided such award be made within the sixty days above mentioned), duly and formally enter into such contract agreeably to the terms of his said proposal, and into such bond for its due performance as shall be required of him, or if his said proposal shall not be accepted and such contract not be awarded him then this obligation shall be void, otherwise, that is to say, if either he shall withdraw his proposal within said sixty days or fail to enter within said ten days into such contract if awarded him and into such bond, to remain in full force, effect, and virtue.

WALTER WOOD. [SEAL.]
SAMUEL R. C. MATHEWS. [SEAL.]
H. P. KREMER. [SEAL.]

Witnesses:
J. H. DIEFFENBACH.

(Executed in triplicate.)

Justification of the sureties.

STATE OF PENNSYLVANIA,
County of Philadelphia, ss:

I, Samuel R. C. Mathews, one of the sureties named in the within bond, affirm that I am pecuniarily worth the sum of twenty thousand dollars ($20,000) over and above all my debts and liabilities.

SAMUEL R. C. MATHEWS.

Before me,
[SEAL.]

CHARLES W. SPARHAWK,
A Notary Public for the Commonwealth of Pennsylvania, residing in the city and county of Philadelphia.

STATE OF PENNSYLVANIA,
County of Philadelphia, ss:

I, H. P. Kremer, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of twenty thousand dollars ($20,000) over and above all my debts and liabilities.

Before me,
[SEAL.]

H. P. KREMER.

CHARLES W. SPARHAWK,
A Notary Public for the Commonwealth of Pennsylvania, residing in the city and county of Philadelphia.

Certificate.

OFFICE OF U. S. ATTORNEY,
Philadelphia, Pa., Aug. 31, 1883.

I, John K. Valentine, do hereby certify that Samuel R. C. Mathews and Herman P. Kremer, the sureties above named, are personally known to me, and that to the best of my knowledge and belief each is pecuniarily worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

JOHN K. VALENTINE,
U. S. Attorney.

[Committee, No. 46.]

Advertisement, instructions, specifications, proposals, and bidder's bond for cast-iron water-pipes and special castings for increasing the water supply of Washington, D. C.

[Advertisement.]

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., August 8, 1883.

Sealed proposals, in triplicate, will be received at this office until 12 o'clock noon, on Tuesday, September 4, 1883, for furnishing three thousand (3,000) tons, more or less, of cast-iron water-pipes and special castings for the same.

The iron pipe will include 680 lineal feet, 75 inches internal diameter, 6,700 lineal feet, 48 inches internal diameter, 1,060 lineal feet, 12 inches internal diameter, 2,650 lineal feet, 8 inches internal diameter, 420 lineal feet, 6 inches internal diameter.

For specifications, blanks on which bids must be made, and all other information apply at this office.

G. J. LYDECKER,
Major of Engineers, U. S. A.

General instructions for bidders.

1. All proposals must be in triplicate, on the accompanying form. They must be enclosed in a sealed envelope, and endorsed "proposals for cast-iron water-pipes and special castings." This parcel should then be placed inside a second envelope, and be addressed to *Office of the Washington Aqueduct, Georgetown Station, Washington, D. C.* No responsibility shall attach to the officer in charge for the premature opening of any proposal not endorsed as above directed.

2. The bidder's bond—executed in triplicate—must be signed by two (2) responsible sureties in the sum of twenty thousand dollars ($20,000), to be certified to as good and sufficient sureties by a United States district attorney, collector of customs, or any other officer under the United States Government, or responsible person known to this office.

3. A firm will not be accepted as a surety, nor will a partner be accepted as surety for a copartner or for a firm of which he is a member.

4. An officer of a corporation will not be accepted as a surety for such corporation.

5. Where firms bid, the individual names of the members should be written out, and should be signed in full, giving the Christian names; but the signers may, if they choose, describe themselves in addition as doing business under a given name and style as a firm.

6. Signatures of obligor and sureties to bidder's bond must have affixed to them seals of wax or wafer.

7. The place of residence of every bidder, with county and State, must be given after his signature, which must be written in full.

8. Any one signing a proposal as the agent of another, or of others, must file with it legal evidence of his authority so to do.

9. Alterations by erasures or interlineations should be explained or noted in the proposal over the signature of the bidder.

10. If a bidder wishes to withdraw his proposal, he may do so before the time fixed for the opening, without prejudice to himself, by communicating his purpose in writing to the officer who holds it, and when his proposal is reached it will be handed to him or his authorized agent, unread.

11. All prices must be written as well as expressed in figures.

12. The contract which the bidder promises to enter into shall be in the form adopted and in use by the Engineer Department of the Army, blank forms of which can be inspected at this office. Parties making bids are to be understood as accepting the terms and conditions contained in such form of contract.

13. Reasonable grounds for supposing that any bidder is interested in more than one bid for the same item will cause the rejection of all bids in which he is interested.

14. The United States reserves the right to reject any and all bids; also to disregard the bid of any *failing bidder or contractor*, known as such to the Engineer Department.

15. The bidder must satisfy the United States engineer in charge of his ability to furnish the materials or perform the work for which he bids.

16. Transfers of contracts or of interests in contracts are prohibited by law.

17. Bidders are invited to be present at the opening of the bids.

SPECIFICATIONS.

1. The work to be done consists in furnishing and delivering the following pipe and castings, aggregating about three thousand (3,000) tons. But the right is reserved to award contracts for whole amount, or by items, in the following bill, as in the opinion of the United States engineer may best serve the interest of the Government, and bids for the whole or any item will be considered.

Bill of materials.

Number of feet laid.	Inside diameter.	Thickness in inches.	Joint room in inches.	Weight per ft. in pounds.	Weight of each section.	Total weight.	Permitted deviation in weight.
	Inches.						*Per cent.*
680	75	2	(*)	1,575	19,179	1,086,640	2
6,700	48	1½	5-10	775	9,560	5,337,622	2½
1,060	12	67-100	5-10	85	1,048	92,569	3
2,650	8	55-100	4-10	47	600	132,500	3½
420	6	48-100	4-10	32	395	13,860	4

*See drawings.

The quantities indicated in the above bill are to be considered approximate only, and the United States hold the right to increase or diminish the same, not exceeding twenty (20) per cent. of the above amounts.

2. Pipes and castings shall be delivered on either of the wharves in the District of Columbia, or on the cars at either railroad depot in the city of Washington, as ordered by the United States engineer. The contractor shall send with each shipment a schedule, giving the number and weight of each pipe and special casting sent at that time.

3. Every pipe shall have cast upon it, in letters from two (2) to two and one-half (2½) inches long and one-eighth (⅛) inch relief, the initials of the maker's name, the year in which it is cast, and the number, in regular series, in point of time of its casting, thus: A, B, C, 18-3—1; A, B, C, 1883—2, etc.; each size of pipe to have its own series of numbering. Special castings shall have similarly the maker's initials, year of casting, and serial number.

4. Straight pipe must be made of such length as to lay at least twelve (12) feet; in each section they shall be made with hub and spigot joint, which, together with all branches and special castings, shall accurately conform in shape and dimensions to the drawings furnished by the United States engineer and his instructions, from time to time. No pipes or castings will be accepted which are defective in joint room from any cause. Lugs shall be cast on any or all connections and special castings, as may be ordered by the United States engineer. No pipes will be received that are more

than the permitted deviation below the specified weights. For any excess above the deviation allowed no payment will be made.

5. The metal shall be such as to afford the best quality of cast-iron pipe—strong, tough, and of sound even grain, and such as will satisfactorily admit of cutting and drilling.

6. All pipes shall be cast vertically, with the hub end down. They shall be free from all defects and imperfections. They shall be truly cylindrical in the bore, with the inner and outer surfaces concentric; straight in the axis for straight pipe, and true to the required curvature or form in the axis of the other pipes, and shall be internally and externally of the full specified dimensions.

7. The pipes and castings shall be carefully cleaned, without the use of acids or liquids, and then subjected to a careful hammer inspection; they shall then be thoroughly coated while at a temperature of 300° F. with a preparation of coal pitch varnish, which shall be of such character as shall make a smooth coating, tough, and tenacious when cold, and not brittle or with a tendency to scale off.

8. Each pipe or casting shall remain in the bath at least thirty (30) minutes, and until the pipe or casting and pitch have an entirely equal temperature of the degree ordered by the United States engineer.

9. After being carefully drained of surplus pitch, they shall, in the presence of an inspector, to be appointed by the United States engineer in charge, be subjected to a hydraulic pressure of three hundred (300) pounds per square inch, and to a hammer inspection while under this pressure, and, if the United States engineer so determine, they shall be further subjected to a similar test after their delivery on the work and before a final acceptance.

10. The pipes and castings shall be weighed for payment after the application of the coal pitch, and the weight shall be painted conspicuously in white on the outside. If the United States engineer shall so decide, the pipes and castings shall be weighed after delivery in Washington, and the weights so ascertained shall be used in the final settlement of the contract. The ton used shall be the gross ton of twenty-two hundred and forty (2,240) pounds.

11. All tools, materials, men, and expenses necessary for the proper manufacture, inspection, and weighing in the shops, and for the delivery of the pipes and castings as hereinbefore required, shall be furnished by and at the cost of the contractor, not including, however, the salary of the inspector appointed by the United States engineer for any part of the period covered by the contract; but if the services of this inspector should be required for a longer period, because of default on the part of the contractor, his salary for such additional time will be deducted from any amount that may be, or become, due said contractor.

12. The whole process of the manufacture of the pipes and castings shall be open at all times to the inspection of the United States engineer. Specimen casting of the metal used, suitable for a testing machine, shall be made when desired by him, and such castings must bear a tensile strain of sixteen thousand (16,000) pounds per square inch. He shall have power to prevent the use of any metal, mould, or core, which in his opinion may not be proper for the purpose for which it is intended; he shall inspect and approve, or reject, the process of cleaning and testing the pipes, the preparation and application of the pitch varnish; and, in general, the form, size, uniformity, and condition of all pipes. On all these questions the decision of the United States engineer shall be final, and he may further reject, without proving, any casting which is not in conformity with the specifications and drawings furnished.

13. All pipes and castings contracted for must be finally found in all respects sound and conformable to the foregoing requirements. The several inspections will not relieve the contractor of any of his obligations in this respect, and any defective pipes or other castings, which may have passed inspection at the foundry or elsewhere, will be at all times liable to rejection when discovered, until the final adjustment and completion of the contract.

14. The delivery of the pipe and castings shall commence on or before the 1st day of October, 1883, and shall continue at an uniform rate until the 31st day of December, 1883, when the delivery of the entire amount under each and every contract shall be completed. The various sizes, classes, and special castings shall be delivered in such order and at such times as may be required by the United States engineer.

15. Payments will be made on or before the tenth day of each month for all pipes and castings received and accepted in proper order and condition and in accordance with these specifications during the previous calendar month, less twenty (20) per cent. of the amount found due, to be reserved until the satisfactory completion of the contract.

16. To prevent disputes and litigation it is expressly understood that the decisions of the United States engineer shall be final as to the acceptance or rejection of any pipe or casting delivered on the work, and that he shall decide as to the meaning and intent of these specifications, or any obscurity in the wording of them; and, further, that he shall have the right to correct any errors or omissions in them neces-

sary for the proper fulfillment of their intention; the action of such correction to date from the time that the United States engineer gives due notice thereof.

17. The prices bid must cover the entire cost to the United States for the pipes and castings finally accepted under the provisions of these specifications; and for any extra work or change due to any alteration or correction in said specifications, the fair price to be paid shall be determined by the United States engineer, and stated in writing by him at the time such extra work or change is ordered, otherwise no claim for any payment above the regular contract price will be allowed, nor will any claim for extra work be admitted if such work shall have been done without a written order from the United States engineer antedating the execution of the same.

18. Wherever the words United States engineer are used, they refer as well to his authorized agents limited to the particular duties entrusted to them in writing.

PROPOSAL.

WASHINGTON, D. C.,
September 4, 1883.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

SIR: In accordance with your advertisement of August 8, 1883, inviting proposals for cast-iron water-pipes and special castings, for increasing the water supply of Washington, D. C., and subject to all the conditions and requirements thereof, and of your specifications of the same date, copies of both of which are hereto attached, and, so far as they relate to this proposal, are made a part of it, we (or I) propose to furnish the pipe and castings at the following prices, viz:

For seventy-five (75) inch cast-iron water-pipes, including special castings, at seventy-five ($75) dollars and ——— (——) cents per ton.

For forty-eight (48) inch cast-iron water-pipes, including special castings, at thirty-five ($35) dollars and twenty (20) cents per ton.

For twelve (12) inch cast-iron water-pipes, including special castings, at forty ($40) dollars and ——— (——) cents per ton.

For eight (8) inch cast-iron water-pipes, including special castings, at forty-one ($41) dollars and ——— (——) cents per ton.

For six (6) inch cast-iron water-pipes, including special castings, at forty-two ($42) dollars and ——— (——) cents per ton.

We (or I) make this proposal with a full knowledge of the kind, quantity, and quality of the pipes and castings required, and, if it is accepted, will, after receiving written notice of such acceptance, enter into contract within ten (10) days, with good and sufficient sureties for the faithful performance thereof. The modifications on the margin of this proposal form a part of the bid: I can begin the delivery of the six (6), eight (8″), and twelve (12″) inch pipes by the first of October, 1883, and complete the same by the fifteenth of October, 1883, and will begin the delivery of the forty-eight (48″) inch and seventy-five inch (75″) by November 15, 1883, and complete the same by March 1, 1884. If it is not required to subject the seventy-five inch (75″) pipe to a hydraulic test I will furnish them for fifty-five ($55) dollars and sixty (60) cents per ton.

ANDREW H. MCNEAL,
Burlington, N. J.

In case of a firm, add names of partners.
(Signed in triplicate.)

Bidder's bond.

Know all men by these presents that we, Andrew H. McNeal, of Burlington, Burlington County, N. J., as principal, and Samuel Sloan, of No. 21 West 17th st., New York City, and Percy R. Pyne, of No. 25 East 22d st., New York City, as sureties, are held and bound unto the United States of America in the penal sum of twenty thousand dollars ($20,000), to the payment of which sum, well and truly to be made, we do bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents.

Given under our hands and seals this thirtieth day of August, 1883.

The condition of this obligation is such that whereas the above bounden Andrew H. McNeal, in response to a public advertisement and notice, dated August 8, 1883, and given and published by Major G. J. Lydecker, Corps of Engineers, United States Army, has made and presented to Major G. J. Lydecker, Corps of Engineers, United States Army, a formal proposal, in writing, whereby he has proposed and agreed to enter into a contract with Major G. J. Lydecker, Corps of Engineers, United States Army, for furnishing cast-iron water-pipes and special castings, according to the terms and conditions set forth in said advertisement and notice:

Now, therefore, if the said Andrew H. McNeal shall not withdraw his said proposal within sixty days from the date of opening the proposals, and shall within ten days

from the date on which he may be notified that his said proposal has been accepted, and the said contract awarded to him (provided such award be made within the sixty days above mentioned), duly and formally enter into such contract agreeably to the terms of his said proposal, and into such bond for its due performance as shall be required of him, or if his said proposal shall not be accepted and such contract not be awarded him, then this obligation shall be void, otherwise, that is to say, if either he shall withdraw his proposal within said sixty days, or fail to enter within said ten days into such contract if awarded and into such bond, to remain in full force, effect, and virtue.

ANDREW H. MCNEAL. [SEAL.]
SAM SLOAN. [SEAL.]
PERCY R. PYNE. [SEAL.]

Witnesses:
THEO. STURGES.
A. S. PALMER.

(Executed in triplicate.)

Justification of the sureties.

STATE OF NEW YORK,
City and County of New York, ss:

I, Percy R. Pyne, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of forty thousand dollars ($40,000) over and above all my debts and liabilities.

PERCY R. PYNE.

Before me—

EDWARD L. ORDEN,
U. S. Commissioner for the Southern Dist. of New York.

STATE OF NEW YORK,
City and County of New York, ss:

I, Samuel Sloan, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of forty thousand dollars ($40,000) over and above all my debts and liabilities.

SAM SLOAN.

Before me—

EDWARD L. ORDEN,
U. S. Commissioner for the Southern Dist. of New York.

Certificate.

I, Edward L. Orden, do hereby certify that Sam Sloan and Percy R. Pyne, the sureties above named, are personally known to me, and that, to the best of my knowledge and belief, each is pecuniarly worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

EDWARD L. ORDEN,
U. S. Commissioner for the Southern Dist. of New York.

[Committee, No. 47.]

Advertisement, instructions, specifications, proposals, and bidder's bond for cast-iron water-pipes and special castings for increasing the water supply of Washington, D. C.

[Advertisement.]

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., August 8, 1883.

Sealed proposals in triplicate will be received at this office until 12 o'clock noon, on Tuesday, September 4, 1883, for furnishing three thousand (3,000) tons, more or less, of cast-iron water-pipes and special castings for the same.

The iron pipe will include 680 lineal feet, 75 inches internal diameter; 6,700 lineal feet, 48 inches internal diameter; 1,060 lineal feet, 12 inches internal diameter; 2,650 lineal feet, 8 inches internal diameter; 420 lineal feet, 6 inches internal diameter.

For specifications, blanks on which bids must be made, and all other information, apply at this office.

G. J. LYDECKER,
Major of Engineers, U. S. A.

General instructions for bidders.

1. All proposals must be in triplicate, on the accompanying form. They must be enclosed in a sealed envelope, and endorsed "Proposals for cast-iron water-pipes and special castings." The parcel should then be placed inside a second envelope, and be addressed to *Office of the Washington Aqueduct, Georgetown Station, Washington, D. C.* No responsibility shall attach to the officer in charge for the premature opening of any proposal not endorsed as above directed.

2. The bidder's bond—executed in triplicate—must be signed by two (2) responsible sureties in the sum of twenty thousand dollars ($20,000), to be certified to as good and sufficient sureties by a United States district attorney, collector of customs, or any other officer under the United States Government, or responsible person known to this office.

3. A firm will not be accepted as a surety, nor will a partner be accepted as surety for a copartner or for a firm of which he is a member.

4. An officer of a corporation will not be accepted as surety for such corporation.

5. Where firms bid, the individual names of the members should be written out, and should be signed in full, giving the Christian names; but the signers may, if they choose, describe themselves in addition as doing business under a given name and style as a firm.

6. Signatures of obligor and sureties to bidder's bond must have affixed to them seals of wax or wafer.

7. The place of residence of every bidder, with county and State, must be given after his signature, which must be written in full.

8. Any one signing a proposal as the agent of another, or of others, must file with it legal evidence of his authority so to do.

9. Alterations by erasures or interlineations should be explained or noted in the proposal over the signature of the bidder.

10. If a bidder wishes to withdraw his proposal, he may do so before the time fixed for the opening, without prejudice to himself, by communicating his purpose in writing to the officer who holds it, and when his proposal is reached it will be handed to him or his authorized agent, unread.

11. All prices must be written as well as expressed in figures.

12. The contract which the bidder promises to enter into shall be in the form adopted and in use by the Engineer Department of the Army, blank forms of which can be inspected at this office. Parties making bids are to be understood as accepting the terms and conditions contained in such form of contract.

13. Reasonable grounds for supposing that any bidder is interested in more than one bid for the same item will cause the rejection of all bids in which he is interested.

14. The United States reserves the right to reject any and all bids; also to disregard the bid of any *failing bidder or contractor*, known as such to the Engineer Department.

15. The bidder must satisfy the United States engineer in charge of his ability to furnish the materials or perform the work for which he bids.

16. Transfers of contracts or of interests in contracts are prohibited by law.

17. Bidders are invited to be present at the opening of the bids.

SPECIFICATIONS.

1. The work to be done consists in furnishing and delivering the following pipe and castings, aggregating about three thousand (3,000) tons. But the right is reserved to award contracts for whole amount, or by items, in the following bill, as in the opinion of the United States engineer may best serve the interest of the Government, and bids for the whole or any item will be considered.

Bill of materials.

Number of feet laid.	Inside diameter.	Thickness in inches.	Joint room in inches.	Weight per ft. in pounds.	Weight of each section.	Total weight.	Permitted deviation in weight.
	Inches.						*Per cent.*
680	75	2	(*)	1,575	19,179	1,086,640	2
6,700	48	1½	5-10	775	9,560	5,337,622	2½
1,060	12	67-100	5-10	85	1,048	92,569	3
2,650	8	55-100	4-10	47	600	132,500	3½
420	6	48-100	4-10	32	395	13,860	4

*See drawings.

The quantities indicated in the above bill are to be considered approximate only, and the United States hold the right to increase or diminish the same, not exceeding twenty (20) per cent. of the above amounts.

2. Pipes and castings shall be delivered on either of the wharves in the District of Columbia, or on the cars at either railroad depot in the city of Washington, as ordered by the United States engineer. The contractor shall send with each shipment a schedule, giving the number and weight of each pipe and special casting sent at that time.

3. Every pipe shall have cast upon it, in letters from two (2) to two and one-half (2½) inches long and one-eighth (⅛) inch relief, the initials of the maker's name, the year in which it is cast, and the number, in regular series, in point of time of its casting, thus: A, B, C, 1883—1; A, B, C, 1883—2, etc.; each size of pipe to have its own series of numbering. Special castings shall have similarly the maker's initials, year of casting, and serial number.

4. Straight pipe must be made of such length as to lay at least twelve (12) feet; in each section they shall be made with hub and spigot joint, which, together with all branches and special castings, shall accurately conform in shape and dimensions to the drawings furnished by the United States engineer and his instructions from time to time. No pipes or castings will be accepted which are defective in joint room from any cause. Lugs shall be cast on any or all connections and special castings, as may be ordered by the United States engineer. No pipes will be received that are more than the permitted deviation below the specified weights. For any excess above the deviation allowed no payment will be made.

5. The metal shall be such as to afford the best quality of cast-iron pipe—strong, tough, and of sound, even grain, and such as will satisfactorily admit of cutting and drilling.

6. All pipes shall be cast vertically, with the hub end down. They shall be free from all defects and imperfections. They shall be truly cylindrical in the bore, with the inner and outer surfaces concentric; straight in the axis for straight pipe, and true to the required curvature or form in the axis of the other pipes, and shall be internally and externally of the full specified dimensions.

7. The pipes and castings shall be carefully cleaned, without the use of acids or liquids, and then subjected to a careful hammer inspection; they shall then be thoroughly coated while at a temperature of 300° F. with a preparation of coal pitch varnish, which shall be of such character as shall make a smooth coating, tough and tenacious when cold, and not brittle or with a tendency to scale off.

8. Each pipe or casting shall remain in the bath at least thirty (30) minutes, and until the pipe or casting and pitch have an entirely equal temperature of the degree ordered by the United States engineer.

9. After being carefully drained of surplus pitch, they shall, in the presence of an inspector, to be appointed by the United States engineer in charge, be subjected to a hydraulic pressure of three hundred (300) pounds per square inch, and to a hammer inspection while under this pressure, and, if the United States engineer so determine, they shall be further subjected to a similar test after their delivery on the work and before a final acceptance.

10. The pipes and castings shall be weighed for payment after the application of the coal pitch, and the weight shall be painted conspicuously in white on the outside. If the United States engineer shall so decide, the pipes and castings shall be weighed after delivery in Washington, and the weights so ascertained shall be used in the final settlement of the contract. The ton used shall be the gross ton of twenty-two hundred and forty (2240) pounds.

11. All tools, materials, men, and expenses necessary for the proper manufacture, inspection, and weighing in the shops, and for the delivery of the pipes and castings as hereinbefore required, shall be furnished by and at the cost of the contractor, not including, however, the salary of the inspector appointed by the United States engineer, for any part of the period covered by the contract; but if the services of this inspector should be required for a longer period, because of default on the part of the contractor, his salary for such additional time will be deducted from any amount that may be, or become, due said contractor.

12. The whole process of the manufacture of the pipes and castings shall be open at all times to the inspection of the United States engineer. Specimen casting of the metal used, suitable for a testing machine, shall be made when desired by him, and such castings must bear a tensile strain of sixteen thousand (16,000) pounds per square inch. He shall have power to prevent the use of any metal, mould, or core, which in his opinion may not be proper for the purpose for which it is intended; he shall inspect and approve, or reject, the process of cleaning and testing the pipes, the preparation and application of the pitch varnish; and, in general, the form, size, uniformity, and condition of all pipes. On all these questions the decision of the United States engineer shall be final, and he may further reject, without proving, any casting which is not in conformity with the specifications and drawings furnished.

13. All pipes and castings contracted for must be finally found in all respects sound

and conformable to the foregoing requirements. The several inspections will not relieve the contractor of any of his obligations in this respect, and any defective pipes, or other castings, which may have passed inspection at the foundry, or elsewhere, will be at all times liable to rejection when discovered, until the final adjustment and completion of the contract.

14. The delivery of the pipe and castings shall commence on or before the when the delivery of the entire amount under each and every contract shall be completed. The various sizes, classes, and special castings shall be delivered in such order and at such times as may be required by the United States engineer.

15. Payments will be made on or before the tenth day of each month for all pipes and castings received and accepted in proper order and condition and in accordance with these specifications during the previous calendar month, less twenty (20) per cent. of the amount found due, to be reserved until the satisfactory completion of the contract.

16. To prevent disputes and litigation it is expressly understood that the decisions of the United States engineer shall be final as to the acceptance or rejection of any pipe or casting delivered on the work, and that he shall decide as to the meaning and intent of these specifications, or any obscurity in the wording of them; and, further that he shall have the right to correct any errors or omissions in them necessary for the proper fulfillment of their intention; the action of such correction to date from the time that the United States engineer gives due notice thereof.

17. The prices bid must cover the entire cost to the United States for the pipes and castings finally accepted under the provisions of these specifications; and for any extra work or change due to any alteration or correction in said specifications, the fair price to be paid shall be determined by the United States engineer, and stated in writing by him at the time such extra work or change is ordered, otherwise no claim for any payment above the regular contract price will be allowed, nor will any claim for extra work be admitted if such work shall have been done without a written order from the United States engineer antedating the execution of the same.

18. Wherever the words United States engineer are used, they refer as well to his authorized agents limited to the particular duties entrusted to them in writing.

GLOUCESTER IRON WORKS,
Philadelphia, Pa., Sept. 3, 1883.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

DEAR SIR: In making our proposition for 48″ pipe, we propose to furnish them with sockets five (5″) inches in depth instead of size as shown, in your drawings, and the time of delivery to commence October 1st and complete order by Feb'y 1st, 1884.

Yours truly,

J. P. MICHELLON,
Sec'y.

(In triplicate.)

PROPOSAL.

PHILADELPHIA, PA.,
Sept. 3, 1883.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

SIR: In accordance with your advertisement of August 8, 1883, inviting proposals for cast-iron water-pipes and special castings, for increasing the water supply of Washington, D. C., and subject to all the conditions and requirements thereof, and of your specifications of the same date, with the changes as to time, etc., enclosed, copies of both of which are hereto attached, and, so far as they relate to this proposal, are made a part of it, we (or I) propose to furnish the pipe and castings at the following prices, viz:

For forty-eight (48) inch cast-iron water-pipes, including special castings, at forty-five ($45) dollars and ——— (——) cents per ton.

For twelve (12) inch cast-iron water-pipes, including special castings, at forty-two ($42) dollars and (39) cents per ton.

For eight (8) inch cast-iron water-pipes, including special castings, at forty-three ($43) dollars and ——— (——) cents per ton.

For six (6) inch cast-iron water-pipes, including special castings, at forty-four (44.80) dollars and eighty (80) cents per ton.

(See letter as to time, etc.)

We (or I) make this proposal with a full knowledge of the kind, quantity, and quality of the pipes and castings required, and, if it is accepted, will, after receiving written notice of such acceptance, enter into contract within ten (10) days, with good and sufficient sureties for the faithful performance thereof.

GLOUCESTER IRON WORKS,
J. P. MICHELLON, *Sec't'y.* [SEAL.]
No. 6, North 7th st., Philadelphia, Pa.

In case of a firm, add names of partners.
(Signed in triplicate.)

Bidder's bond.

Know all men by these presents that we, the Gloucester Iron Works, a corporation in pursuance of the laws of New Jersey, of ——— ———, as principal, and the Philad'a Trust, Safe, Deposit, and Insurance Co. of Philadelphia, Pa., as sureties, are held and bound unto the United States of America in the penal sum of twenty thousand dollars ($20,000), to the payment of which sum, well and truly to be made, we do bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents.

Given under our hands and seals this 3d day of Sept., 1883.

The condition of this obligation is such that whereas the above bounden, the Gloucester Iron Works, in response to a public advertisement and notice, dated August 8, 1883, and given and published by Major G. J. Lydecker, Corps of Engineers, United States Army, have made and presented to Major G. J. Lydecker, Corps of Engineers, United States Army, a formal proposal, in writing, whereby they have proposed and agreed to enter into a contract with Major G. J. Lydecker, Corps of Engineers, United States Army, for furnishing cast-iron water-pipes and special castings, according to the terms andconditions set forth in said advertisement and notice:

Now, therefore, if the said Gloucester Iron Works shall not withdraw said proposal within sixty days from the date of opening the proposals, and shall within ten days from the date on which they may be notified that said proposal has been accepted, and the said contract awarded to them (provided such award be made within the sixty days above mentioned), duly and formally enter into such contract agreeably to the terms of said proposal, and into such bond for its due performance as shall be required of them, or if said proposal shall not be accepted and such contract not be awarded them, then this obligation shall be void, otherwise, that is to say, if either shall withdraw this proposal within said sixty days, or fail to enter within said ten days into such contract if awarded them and into such bond, to remain in full force, effect, and virtue.

GLOUCESTER IRON WORKS,
J. P. MICHELLON, *Sec't'y.* [SEAL.]
THE PHILADELPHIA TRUST, SAFE DEPOSIT, AND INSURANCE COMPANY,
T. L. LORINGER, *Pres't.* [SEAL.]

Attest.

W. L. DU BOIS,
Secretary.

Witnesses:
WM. J. WOLFE.

(Executed in triplicate.)

Justification of the sureties.

STATE OF ——— ———,
County of ——— ———, *ss:*

I, ——— ———, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of ——— thousand dollars ($——) over and above all my debts and liabilities.

(Signature of surety) ——— ———.

Before me,
(Signature of officer administering oath, with seal, if any) ——— ———.

STATE OF ——— ———,
County of ——— ———, *ss:*

I, ——— ———, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of ——— thousand dollars ($———) over and above all my debts and liabilities.

(Signature of surety) ——— ———.

Before me,
(Signature of officer administering oath, with seal, if any) ——— ———.

Certificate.

I, H. S. Huidekoper, postmaster, do hereby certify that the Philadelphia Trust, Safe Deposit, and Insurance Company, the sureties above named, are personally known to me, and that, to the best of my knowledge and belief, each is pecuniarily worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

H. S. HUIDEKOPER, *P. M.*

[Committee, No. 48.]

Advertisement, instructions, specifications, proposals, and bidder's bond, for cast-iron water-pipes and special castings, for increasing the water supply of Washington, D. C.

[Advertisement.]

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., August 8, 1883.

Sealed proposals, in triplicate, will be received at this office until 12 o'clock noon, on Tuesday, September 4, 1883, for furnishing three thousand (3,000) tons, more or less, of cast-iron water-pipes and special castings for the same.

The iron pipe will include 680 lineal feet, 75 inches internal diameter; 6,700 lineal feet, 48 inches internal diameter; 1,060 lineal feet, 12 inches internal diameter; 2,650 lineal feet, 8 inches internal diameter; 420 lineal feet, 6 inches internal diameter.

For specifications, blanks on which bids must be made, and all other information, apply at this office.

G. J. LYDECKER,
Major of Engineers, U. S. A.

General instructions for bidders.

1. All proposals must be in triplicate, on the accompanying form. They must be enclosed in a sealed envelope, and endorsed "Proposals for cast-iron water-pipes and special castings." This parcel should then be placed inside a second envelope, and be addressed to *Office of the Washington Aqueduct, Georgetown Station, Washington, D. C.* No responsibility shall attach to the officer in charge for the premature opening of any proposal not endorsed as above directed.

2. The bidder's bond—executed in triplicate—must be signed by two (2) responsible sureties in the sum of twenty thousand dollars ($20,000), to be certified to as good and sufficient sureties by a United States district attorney, collector of customs, or any other officer under the United States Government, or responsible person known to this office.

3. A firm will not be accepted as a surety, nor will a partner be accepted as surety for a copartner or for a firm of which he is a member.

4. An officer of a corporation will not be accepted as surety for such corporation.

5. When firms bid, the individual names of the members should be written out, and should be signed in full, giving the Christian names; but the signers may, if they choose, describe themselves in addition as doing business under a given name and style as a firm.

6. Signatures of obligor and sureties to bidder's bond must have affixed to them seals of wax or wafer.

7. The place of residence of every bidder, with county and State, must be given after his signature, which must be written in full.

8. Any one signing a proposal as the agent of another, or of others, must file with it legal evidence of his authority so to do.

9. Alterations by erasures or interlineations should be explained or noted in the proposal over the signature of the bidder.

10. If a bidder wishes to withdraw his proposal, he may do so before the time fixed for the opening, without prejudice to himself, by communicating his purpose in writing to the officer who holds it, and when his proposal is reached, it will be handed to him or his authorized agent, unread.

11. All prices must be written as well as expressed in figures.

12. The contract which the bidder promises to enter into shall be in the form adopted and in use by the Engineer Department of the Army, blank forms of which can be inspected at this office. Parties making bids are to be understood as accepting the terms and conditions contained in such form of contract.

13. Reasonable grounds for supposing that any bidder is interested in more than one bid for the same item will cause the rejection of all bids in which he is interested.

14. The United States reserves the right to reject any and all bids; also to disregard the bid of any *failing bidder or contractor*, known as such to the Engineer Department.

15. The bidder must satisfy the United States engineer in charge of his ability to furnish the materials or perform the work for which he bids.

16. Transfers of contracts or of interests in contracts are prohibited by law.

17. Bidders are invited to be present at the opening of the bids.

SPECIFICATIONS.

1. The work to be done consists in furnishing and delivering the following pipe and castings, aggregating about three thousand (3,000) tons. But the right is reserved to award contracts for whole amount, or by items, in the following bill, as in the opinion of the United States engineer may best serve the interest of the Government, and bids for the whole or any item will be considered:

Bill of materials.

Number of feet laid.	Inside diameter.	Thickness in inches.	Joint room in inches.	Weight per ft. in pounds.	Weight of each section.	Total weight.	Permitted deviation in weight.
	Inches.						*Per cent.*
680	75	2	(*)	1,575	19,179	1,086,640	2
6,700	48	1½	5–10	775	9,560	5,337,622	2½
1,060	12	67–100	5–10	85	1,048	92,569	3
2,650	8	55–100	4–10	47	600	132,500	3½
420	6	48–100	4–10	32	395	13,860	4

*See drawings.

The quantities indicated in the above bill are to be considered approximate only, and the United States hold the right to increase or diminish the same, not exceeding twenty (20) per cent. of the above amounts.

2. Pipes and castings shall be delivered on either of the wharves in the District of Columbia, or on the cars at either railroad depot in the city of Washington, as ordered by the United States engineer. The contractor shall send with each shipment a schedule, giving the number and weight of each pipe and special casting sent at that time.

3. Every pipe shall have cast upon it, in letters from two (2) to two and one-half (2½) inches long and one-eighth (⅛) inch relief, the initials of the maker's name, the year in which it is cast, and the number, in regular series, in point of time, of its casting, thus: A, B, C, 1883—1; A, B, C, 1883—2, etc.; each size of pipe to have its own series of numbering. Special castings shall have similarly the maker's initials, year of casting, and serial number.

4. Straight pipe must be made of such length as to lay at least twelve (12) feet: in each section they shall be made with hub and spigot joint, which, together with all branches and special castings, shall accurately conform in shape and dimensions to the drawings furnished by the United States engineer and his instructions from time to time. No pipes or castings will be accepted which are defective in joint room from any cause. Lugs shall be cast on any or all connections and special castings, as may be ordered by the United States engineer. No pipes will be received that are more than the permitted deviation below the specified weights. For any excess above the deviation allowed no payment will be made.

5. The metal shall be such as to afford the best quality of cast-iron pipe—strong, tough, and of sound, even grain, and such as will satisfactorily admit of cutting and drilling.

6. All pipes shall be cast vertically, with the hub end down. They shall be free from all defects and imperfections. They shall be truly cylindrical in the bore, with the inner and outer surfaces concentric; straight in the axis for straight pipe, and true to the required curvature or form in the axis of the other pipes, and shall be internally and externally of the full specified dimensions.

7. The pipes and castings shall be carefully cleaned, without the use of acids or liquids, and then subjected to a careful hammer inspection; they shall then be thoroughly coated while at a temperature of 300° F. with a preparation of coal-pitch varnish, which shall be of such character as shall make a smooth coating, tough and tenacious when cold, and not brittle or with a tendency to scale off.

8. Each pipe or casting shall remain in the bath at least thirty (30) minutes, and until the pipe or casting and pitch have an entirely equal temperature of the degree ordered by the United States engineer.

9. After being carefully drained of surplus pitch, they shall, in the presence of an inspector, to be appointed by the United States engineer in charge, be subjected to a hydraulic pressure of three hundred (300) pounds per square inch, and to a hammer inspection while under this pressure, and, if the United States engineer so determine, they shall be further subjected to a similar test after their delivery on the work and before a final acceptance.

10. The pipes and castings shall be weighed for payment after the application of the coal pitch, and the weight shall be painted conspicuously in white on the outside. If the United States engineer shall so decide, the pipes and castings shall be weighed after delivery in Washington, and the weights so ascertained shall be used in the final settlement of the contract. The ton used shall be the gross ton of twenty-two hundred and forty (2,240) pounds.

11. All tools, materials, men, and expenses necessary for the proper manufacture, inspection, and weighing in the shops, and for the delivery of the pipes and castings as hereinbefore required, shall be furnished by and at the cost of the contractor, not including, however, the salary of the inspector appointed by the United States engineer, for any part of the period covered by the contract; but if the services of this inspector should be required for a longer period, because of default on the part of the contractor, his salary for such additional time will be deducted from any amount that may be, or become, due said contractor.

12. The whole process of the manufacture of the pipes and castings shall be open at all times to the inspection of the United States engineer. Specimen castings of the metal used, suitable for a testing-machine, shall be made when desired by him, and such castings must bear a tensile strain of sixteen thousand (16,000) pounds per square inch. He shall have power to prevent the use of any metal, mould, or core, which in his opinion may not be proper for the purpose for which it is intended; he shall inspect and approve, or reject, the process of cleaning and testing the pipes, the preparation and application of the pitch varnish; and, in general, the form, size, uniformity, and condition of all pipes. On all these questions the decision of the United States engineer shall be final, and he may further reject, without proving, any casting which is not in conformity with the specifications and drawings furnished.

13. All pipes and castings contracted for must be finally found in all respects sound and conformable to the foregoing requirements. The several inspections will not relieve the contractor of any of his obligations in this respect, and any defective pipes, or other castings, which may have passed inspection at the foundery, or elsewhere, will be at all times liable to rejection when discovered, until the final adjustment and completion of the contract.

14. The delivery of the pipe and castings shall commence on or before the 1st day of October, 1883, and shall continue at an uniform rate until the 31st day of December, 1883, when the delivery of the entire amount under each and every contract shall be completed. The various sizes, classes, and special castings shall be delivered in such order and at such times as may be required by the United States engineer.

15. Payments will be made on or before the tenth day of each month for all pipes and castings received and accepted in proper order and condition and in accordance with these specifications during the previous calendar month, less twenty (20) per cent. of the amount found due, to be reserved until the satisfactory completion of the contract.

16. To prevent disputes and litigation it is expressly understood that the decisions of the United States engineer shall be final as to the acceptance or rejection of any pipe or casting delivered on the work, and that he shall decide as to the meaning and intent of these specifications, or any obscurity in the wording of them; and, further, that he shall have the right to correct any errors or omissions in them necessary for

the proper fulfillment of their intention; the action of such correction to date from the time that the United States engineer gives due notice thereof.

17. The prices bid must cover the entire cost to the United States for the pipes and castings finally accepted under the provisions of these specifications; and for any extra work or change due to any alteration or correction in said specifications the fair price to be paid shall be determined by the United States engineer, and stated in writing by him at the time such extra work or change is ordered, otherwise no claim for any payment above the regular contract price will be allowed, nor will any claim for extra work be admitted if such work shall have been done without a written order from the United States engineer antedating the execution of the same.

18. Wherever the words United States engineer are used, they refer as well to his authorized agents, limited to the particular duties entrusted to them in writing.

WASHINGTON, D. C., *Sept.* 4, 1883.

G. J. LYDECKER,
Major of Engineers, U. S. A.,
Office of Washington Aqueduct, Washington, D. C.

DEAR SIR: We will make and deliver the 75-inch pipe in accordance with the accompanying specifications, for sixty-six dollars per gross ton, provided we are not required to make the pressure test.

Yours, truly,

BUILDERS' IRON FOUNDRY,
By R. A. ROBERTSON, Jr., *Agt.*

PROPOSALS.

WASHINGTON, D. C., *Sept.* 1, 1883.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.

SIR: In accordance with your advertisement of August 8, 1883, inviting proposals for cast-iron water-pipes and special castings for increasing the water supply of Washington, D. C., and subject to all the conditions and requirements thereof, and of your specifications of the same date, copies of both of which are hereto attached, and, so far as they relate to this proposal, are made a part of it, we propose to furnish the pipe and castings at the following prices, viz:

For seventy-five (75) inch cast-iron water-pipes, including special castings, at sixty-nine (69) dollars and ——— (——) cents per ton.

For forty-eight (48) inch cast-iron water-pipes, including special castings, at ——— (——) dollars and ——— (——) cents per ton.

For twelve (12) inch cast-iron water-pipes, including special castings, at ——— (——) dollars and ——— (——) cents per ton.

For eight (8) inch cast iron water-pipes, including special castings, at ——— (——) dollars and ——— (——) cents per ton.

For six (6) inch cast-iron water-pipes, including special castings, at ——— (——) dollars and ——— (——) cents per ton.

We (or I) make this proposal with a full knowledge of the kind, quantity, and quality of the pipes and castings required, and, if it is accepted, will, after receiving written notice of such acceptance, enter into contract within ten (10) days with good and sufficient sureties for the faithful performance thereof.

BUILDERS' IRON FOUNDRY,
By R. A. ROBERTSON, Jr., *Agt.*
Providence, R. I., P. O. box 215.

In case of a firm, add names of partners.
(Signed in triplicate.)

Bidder's bond.

Know all men by these presents, that we, The Builders' Iron Foundry, of Providence, R. I., as principal, and A. C. Barstow, of Providence, R. I., and Charles Dudley, of Providence, R. I., as sureties, are held and bound unto the United States of America in the penal sum of twenty thousand dollars ($20,000), to the payment of which sum, well and truly to be made, we do bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents.

Given under our hands and seals this first day of September, 1883.

The condition of this obligation is such that, whereas, the above bounden The Builders' Iron Foundry, in response to a public advertisement and notice, dated August 8, 1883, and given and published by Major G. J. Lydecker, Corps of Engineers, United States Army, have made and presented to Major G. J. Lydecker, Corps of Engineers, United States Army, a formal proposal, in writing, whereby they have proposed and agreed to enter into contract with Major G. J. Lydecker, Corps of Engineers, United States Army, for furnishing cast-iron water-pipes and special castings, according to the terms and conditions set forth in said advertisement and notice.

Now, therefore, if the said Builders' Iron Foundry of Providence, R. I., shall not withdraw their said proposal within sixty days from the date of opening the proposals, and shall within ten days from the date on which they may be notified that their said proposal has been accepted and the said contract awarded to them (provided such award be made within the sixty days above mentioned), duly and formally enter into such contract agreeably to the terms of their said proposal, and into such bond for its due performance as shall be required of them; or if their said proposal shall not be accepted and such contract not be awarded them, then this obligation shall be void, otherwise, that is to say if either they shall withdraw their proposal within said sixty days, or fail to enter within said ten days into such contract, if awarded them, and into such bond, to remain in full force, effect, and virtue.

A. C. BARSTOW. [SEAL.]
CHARLES DUDLEY. [SEAL.]

Witnesses:
Z. CHAFEE, Jr.
H. A. HARRINGTON.

(Executed in triplicate.)

Justification of the sureties.

STATE OF RHODE ISLAND,
County of Providence, ss:

I, Amos C. Barstow, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of fifty thousand dollars ($50,000) over and above all my debts and liabilities.

A. C. BARSTOW.

Before me,
[SEAL.] HENRY A. HARRINGTON.

STATE OF RHODE ISLAND,
County of Providence, ss:

I, Charles Dudley, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of twenty thousand dollars ($20,000) over and above all my debts and liabilities.

CHARLES DUDLEY.

Before me,
[SEAL.] HENRY A. HARRINGTON.

Certificate.

I, Henry W. Gardner, P. M., do hereby certify that Amos C. Barstow and Charles Dudley, the sureties above named, are personally known to me, and that, to the best of my knowledge and belief, each is pecuniarily worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

HENRY W. GARDNER,
Postmaster.

[Committee No. 49.]

Advertisement, instructions, specifications, proposals, and bidder's bond, for cast-iron water-pipes and special castings, for increasing the water supply in Washington, D. C.

[Advertisement.]

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., August 8, 1883.

Sealed proposals, in triplicate, will be received at this office until 12 o'clock noon, on Tuesday, September 4, 1883, for furnishing three thousand (3,000) tons, more or less, of cast-iron water-pipes and special castings for the same.

The iron pipe will include: 680 lineal feet, 75 inches internal diameter; 6,700 lineal feet, 48 inches internal diameter; 1,060 lineal feet, 12 inches internal diameter; 2,650 lineal feet, 8 inches internal diameter; 420 lineal feet, 6 inches internal diameter.

For specifications, blanks on which bids must be made, and all other information, apply at this office.

G. J. LYDECKER,
Major of Engineers, U. S. A.

General instructions for bidders.

1. All proposals must be in triplicate, on the accompanying form. They must be enclosed in a sealed envelope, and endorsed "proposals for cast-iron water-pipes and special castings." This parcel should then be placed inside a second envelope and be addressed to *Office of the Washington Aqueduct, Georgetown Station, Washington, D. C.* No responsibility shall attach to the officer in charge for the premature opening of any proposal not endorsed as above directed.

2. The bidder's bond—executed in triplicate—must be signed by two (2) responsible sureties in the sum of twenty thousand dollars ($20,000) to be certified to as good and sufficient sureties by a United States district attorney, collector of customs, or any other officer under the United States Government, or responsible person known to this office.

3. A firm will not be accepted as a surety, nor will a partner be accepted as surety for a co-partner or for a firm of which he is a member.

4. An officer of a corporation will not be accepted as surety for such corporation.

5. Where firms bid, the individual names of the members should be written out, and should be signed in full, giving the Christian names; but the signers may, if they choose, describe themselves in addition as doing business under a given name and style as a firm.

6. Signatures of obligor and sureties to bidder's bond must have affixed to them seals of wax or wafer.

7. The place of residence of every bidder, with county and State, must be given after his signature, which must be written in full.

8. Any one signing a proposal as the agent of another, or of others, must file with it legal evidence of authority so to do.

9. Alterations by erasures or interlineations should be explained or noted in the proposal over the signature of the bidder.

10. If a bidder wishes to withdraw his proposal, he may do so before the time fixed for the opening, without prejudice to himself, by communicating his purpose in writing to the officer who holds it, and when his proposal is reached, it will be handed to him or his authorized agent, unread.

11. All prices must be written as well as expressed in figures.

12. The contract which the bidder promises to enter into shall be in the form adopted and in use by the Engineer Department of the Army, blank forms of which can be inspected at this office. Parties making bids are to be understood as accepting the terms and conditions contained in such form of contract.

13. Reasonable grounds for supposing that any bidder is interested in more than one bid for the same item will cause the rejection of all bids in which he is interested.

14. The United States reserves the right to reject any and all bids; also to disregard the bid of any *failing bidder or contractor*, known as such to the Engineer Department.

15. The bidder must satisfy the United States engineer in charge of his ability to furnish the materials or perform the work for which he bids.

16. Transfers of contracts or of interests in contracts are prohibited by law.

17. Bidders are invited to be present at the opening of the bids.

SPECIFICATIONS.

1. The work to be done consists in furnishing and delivering the following pipe and castings, aggregating about three thousand (3,000) tons. But the right is reserved to award contracts for whole amount, or by items, in the following bill, as in the opinion of the United States engineer may best serve the interest of the Government, and bids for the whole or any items will be considered.

Bill of materials.

Number of feet laid.	Inside diameter.	Thickness in inches.	Joint room in inches.	Weight per ft. in pounds.	Weight of each section.	Total weight.	Permitted deviation in weight.
	Inches.				*Pounds.*	*Pounds.*	*Per cent.*
680	75	2	(*)	1,575	19,179	1,088,640	2
6,700	48	1¼	5-10	775	9,560	5,337,622	2½
1,060	12	67-100	5-10	85	1,048	92,569	3
2,650	8	55-100	4-10	47	600	132,500	3½
420	6	48-100	4-10	32	395	13,860	4

* See drawings.

The quantities indicated in the above bill are to be considered approximate only, and the United States hold the right to increase or diminish the same, not exceeding twenty (20) per cent. of the above amounts.

2. Pipes and castings shall be delivered on either of the wharves in the District of Columbia, or on the cars at either railroad depot in the city of Washington, as ordered by the United States engineer. The contractor shall send with each shipment a schedule giving the number and weight of each pipe and special casting sent at that time.

3. Every pipe shall have cast upon it, in letters from two (2) to two and one-half (2½) inches long and one-eighth (⅛) inch relief, the initials of the maker's name, the year in which it is cast, and the number, in regular series, in point of time of its casting, thus: A, B, C, 1883—1; A, B, C, 1883—2, etc.; each size of pipe to have its own series of numbering. Special castings shall have similarly the maker's initials, year of casting, and serial number.

4. Straight pipe must be made of such length as to lay at least twelve (12) feet; in each section they shall be made with hub and spigot joint, which, together with all branches and special castings, shall accurately conform in shape and dimensions to the drawings furnished by the United States engineer and his instructions from time to time. No pipes or castings will be accepted which are defective in joint room from any cause. Lugs shall be cast on any or all connections and special castings, as may be ordered by the United States engineer. No pipes will be received that are more than the permitted deviation below the specified weights. For any excess above the deviation allowed no payment will be made.

5. The metal shall be such as to afford the best quality of cast-iron pipe—strong, tough, and of sound, even grain, and such as will satisfactorily admit of cutting and drilling.

6. All pipes shall be cast vertically, with the hub end down. They shall be free from all defects and imperfections. They shall be truly cylindrical in the bore, with the inner and outer surfaces concentric; straight in the axis for straight pipe, and true to the required curvature or form in the axis of the other pipes, and shall be internally and externally of the full specified dimensions.

7. The pipes and castings shall be carefully cleaned, without the use of acids or liquids, and then subjected to a careful hammer inspection; they shall then be thoroughly coated while at a temperature of 300° F. with a preparation of coal pitch varnish, which shall be of such character as shall make a smooth coating, tough and tenacious when cold, and not brittle or with a tendency to scale off.

8. Each pipe or casting shall remain in the bath at least thirty (30) minutes and until the pipe or casting and pitch have an entirely equal temperature of the degree ordered by the United States engineer.

9. After being carefully drained of surplus pitch they shall, in the presence of an inspector, to be appointed by the United States engineer in charge, be subjected to a hydraulic pressure of three hundred (300) pounds per square inch, and to a hammer inspection while under this pressure, and, if the United States engineer so determine, they shall be further subjected to a similar test after their delivery on the work and before a final acceptance.

10. The pipes and castings shall be weighed for payment after the application of the coal pitch, and the weight shall be painted conspicuously in white on the outside. If the United States engineer shall so decide, the pipes and castings shall be weighed after delivery in Washington, and the weights so ascertained shall be used in the final settlement of the contract. The ton used shall be the gross ton of twenty-two hundred and forty (2240) pounds.

11. All tools, materials, men, and expenses necessary for the proper manufacture, inspection, and weighing in the shops, and for the delivery of the pipes and castings as hereinbefore required, shall be furnished by and at the cost of the contractor, not including, however, the salary of the inspector appointed by the United States engineer, for any part of the period covered by the contract; but if the services of this inspector should be required for a longer period, because of default on the part of the contractor, his salary for such additional time will be deducted from any amount that may be, or become, due said contractor.

12. The whole process of the manufacture of the pipes and castings shall be open at all times to the inspection of the United States engineer. Specimen casting of the metal used, suitable for a testing machine, shall be made when desired by him, and such castings must bear a tensile strain of sixteen thousand (16,000) pounds per square inch. He shall have power to prevent the use of any metal, mould, or core which in his opinion may not be proper for the purpose for which it is intended; he shall inspect and approve, or reject the process of cleaning and testing the pipes, the preparation and application of the pitch varnish; and, in general, the form, size, uniformity, and condition of all pipes. On all these questions the decision of the United States engineer shall be final, and he may further reject, without proving, any casting which is not in conformity with the specifications and drawings furnished.

13. All pipes and castings contracted for must be finally found in all re and conformable to the foregoing requirements. The several inspection lieve the contractor of any of his obligations in this respect, and any def or other castings, which may have passed inspection at the foundry c will be at all times liable to rejection when discovered, until the final and completion of the contract.

14. The delivery of the pipe and castings shall commence on or befor of October, 1883, and shall continue at an uniform rate until the 31st da ber, 1883, when the delivery of the entire amount under each and every co be completed. The various sizes, classes, and special castings shall be such order and at such times as may be required by the United States en

15. Payments will be made on or before the tenth day of each month and castings received and accepted in proper order and condition and in with these specifications during the previous calendar month, less twe cent. of the amount found due, to be reserved until the satisfactory co the contract.

16. To prevent disputes and litigation it is expressly understood that t of the United States engineer shall be final as to the acceptance or rejec pipe or casting delivered on the work, and that he shall decide as to t and intent of these specifications, or any obscurity in the wording of further, that he shall have the right to correct any errors or omissions in sary for the proper fulfillment of their intention; the action of such c date from the time that the United States engineer gives due notice ther

17. The prices bid must cover the entire cost to the United States for th castings finally accepted under the provisions of these specifications; extra work or change due to any alteration or correction in said specifi fair price to be paid shall be determined by the United States engineer a writing by him at the time such extra work or change is ordered, otherw for any payment above the regular contract price will be allowed, nor wi for extra work be admitted if such work shall have been done without a der from the United States engineer antedating the execution of the sam

18. Wherever the words United States engineer are used they refer as authorized agents limited to the particular duties entrusted to them in w

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PROPOSAL.

WEST POINT FOU
Cold Spring, Putnam County, N. Y., August

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

SIR: In accordance with your advertisement of August 8, 1883, invitin for cast-iron water pipes and special castings, for increasing the wat Washington, D. C., and subject to all the conditions and requirements of your specifications of the same date, copies of both of which are heret and, so far as they relate to this proposal, are made a part of it, we (or I furnish the pipe and castings at the following prices, viz:

For seventy-five (75) inch cast-iron water pipes, fifty-two (52) dollars a cents per ton.

We (or I) make this proposal with a full knowledge of the kind, qu quality of the pipes and castings required, and, if it is accepted, will, aft written notice of such acceptance, enter into contract within ten (10) day and sufficient sureties for the faithful performance thereof.

WEST POINT FOUNDRY ASSOCIA
Per G. PAULDING, *Pres't.* [S
Cold Spring, Putnam Cou

In case of a firm, add names of partners.
(Signed in triplicate.)

Bidder's bond.

Know all men by these presents, That we, the West Point Foundry per G. Paulding, pres't, of Cold Spring, Putnam County, N. Y., as pri ——— ———, of ——— ———, and ——— ———, of ——— ———, as suret and bound unto the United States of America in the penal sum of six th lars ($6,000), to the payment of which sum, well and truly to be made,

ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents.

Given under our hands and seals this —— day of ——, 1883.

The condition of this obligation is such that, whereas the above bounden West Point Foundry Association, in response to a public advertisement and notice, dated August 8, 1883, and given and published by Major G. J. Lydecker, Corps of Engineers, United States Army, ha— made and presented to Major G. J. Lydecker, Corps of Engineers, United States Army, a formal proposal, in writing, whereby —he— ha— proposed and agreed to enter into a contract with Major G. J. Lydecker, Corps of Engineers, United States Army, for furnishing cast-iron water pipes and special castings, according to the terms and conditions set forth in said advertisement and notice.

Now, therefore, if the said West Point Foundry Association shall not withdraw the said proposal within sixty days from the date of opening the proposals, and shall within ten days from the date on which they may be notified that their said proposal has been accepted, and the said contract awarded to them (provided such award be made within the sixty days above mentioned), duly and formally enter into such contract agreeably to the terms of their said proposal, and into such bond for its due performance as shall be required of them, or if their said proposal shall not be accepted and such contract not be awarded to them, then this obligation shall be void, otherwise, that is to say, if either they shall withdraw their proposal within said sixty days, or fail to enter within said ten days into such contract if awarded to them and into such bond, to remain in full force, effect, and virtue.

WEST POINT FOUNDRY ASSOCIATION,
Per G. PAULDING, *Pres't.* [SEAL.]
PETER P. PARROTT. [SEAL.]
W. I. PAULDING. [SEAL.]

Witnesses:
S. F. BURROWS,
CHAS. NIUMS,
Cold Spring, Putnam Co., N. Y.,
as to the signature of G. Paulding, pres't.

R. D. A. PARROTT,
CHAS. M. NICHOLS,
Greenwood Iron Works, Orange Co., N. Y.,
as to the signature of Peter P. Parrott.

FRANCIS D. LAMBERT,
WILLIAM HUMPHREYS,
Cold Spring, Putnam Co., N. Y.,
as to signature of W. I. Paulding.

(Executed in triplicate.)

JUSTIFICATION OF THE SURETIES.

STATE OF NEW YORK,
County of Orange, ss:

I, Peter P. Parrott, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of twenty thousand dollars ($20,000) over and above all my debts and liabilities.

PETER P. PARROTT.

Before me,
[SEAL.]

CHAS. M. NICHOLS,
Notary Public, Orange Co., N. Y.

STATE OF NEW YORK,
County of Putnam, ss:

I, W. I. Paulding, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of twenty thousand dollars ($20,000) over and above all my debts and liabilities.

W. I. PAULDING.

Before me,
[SEAL.]

CHAS. H. FERRIS,
Notary Public in and for Putnam Co., N. Y.

Certificate.

I, Charles H. Ferris, do hereby certify that Peter P. Parrott and W. I. Paulding, the sureties above named, are personally known to me, and that, to the best of my

knowledge and belief, each is pecuniarily worth, over and above all
liabilities, the sum stated in the accompanying affidavit subscribed by

C. H.
Notary Public, Putna

I, M. B. Blake, do hereby certify that Peter P. Parrott and William I.
securities above named, are personally known to me, and that, to the bes
ledge and belief, each is pecuniarily worth, over and above all his deb
ties, the sum stated in the accompanying affidavit subscribed by him.

M. B.
Collector 2d D

[Committee No. 50.]

Advertisement, instructions, specifications, proposals, and bidder's bond for c
pipes and special castings for increasing the water supply of Washingt

[Advertisement.]

OFFICE OF THE WASHINGTON AQU
Washington, D. C., Au

Sealed proposals, in triplicate, will be received at this office until 12
on Tuesday, September 4, 1883, for furnishing three thousand (3,000)
less, of cast-iron water pipes and special castings for the same.

The iron pipe will include 680 lineal feet, 75 inches internal diamete
feet, 48 inches internal diameter; 1,060 lineal feet, 12 inches internal di
lineal feet, 8 inches internal diameter; 420 lineal feet, 6 inches internal

For specifications, blanks on which bids must be made, and all othe
apply at this office.

G. J. L
Major of Engine

General instructions for bidders.

1. All proposals must be in triplicate, on the accompanying form.
enclosed in a sealed envelope, and endorsed "Proposals for cast-iron wa
special castings." This parcel should then be placed inside a second env
addressed to *Office of the Washington Aqueduct, Georgetown Station, Was*
No responsibility shall attach to the officer in charge for the prematu
any proposal not endorsed as above directed.

2. The bidder's bond—executed in triplicate—must be signed by two
ble sureties in the sum of twenty thousand dollars ($20,000), to be
good and sufficient sureties by a United States district attorney, collecto
or any other officer under the United States Government, or responsible
to this office.

3. A firm will not be accepted as a surety, nor will a partner be accep
for a copartner or for a firm of which he is a member.

4. An officer of a corporation will not be accepted as surety for such

5. Where firms bid the individual names of the members should be wr
should be signed in full, giving the Christian names; but the signers
choose, describe themselves in addition as doing business under a giv
style as a firm.

6. Signatures of obligor and sureties to bidder's bond must have affixed
of wax or wafer.

7. The place of residence of every bidder, with county and State, m
after his signature, which must be written in full.

8. Any one signing a proposal as the agent of another, or of others, m
it legal evidence of his authority so to do.

9. Alterations by erasures or interlineations should be explained on
proposal over the signature of the bidder.

10. If a bidder wishes to withdraw his proposal he may do so before
for the opening, without prejudice to himself, by communicating his pu
ing to the officer who holds it, and when his proposal is reached it will
him or his authorized agent unread.

11. All prices must be written as well as expressed in figures.

12. The contract which the bidder promises to enter into shall be
adopted and in use by the Engineer Department of the Army, blank fo

can be inspected at this office. Parties making bids are to be understood as accepting the terms and conditions contained in such form of contract.

13. Reasonable grounds for supposing that any bidder is interested in more than one bid for the same item will cause the rejection of all bids in which he is interested.

14. The United States reserves the right to reject any and all bids; also to disregard the bid of any *failing bidder or contractor*, known as such to the Engineer Department.

15. The bidder must satisfy the United States engineer in charge of his ability to furnish the materials or perform the work for which he bids.

16. Transfers of contracts or of interests in contracts are prohibited by law.

17. Bidders are invited to be present at the opening of the bids.

SPECIFICATIONS.

1. The work to be done consists in furnishing and delivering the following pipe and castings, aggregating about three thousand (3,000) tons. But the right is reserved to award contracts for whole amount, or by items, in the following bill, as in the opinion of the United States engineer may best serve the interest of the Government, and bids for the whole or any items will be considered.

Bill of materials.

Number of feet laid.	Inside diameter.	Thickness in inches.	Joint room in inches.	Weight per ft. in pounds.	Weight of each section.	Total weight.	Permitted deviation in weight.
	Inches.						*Per cent.*
680	75	2	(*)	1,575	19,179	1,086,610	2
6,700	48	1½	5–10	775	9,560	5,337,622	2½
1,060	12	67–100	5–10	85	1,048	92,569	3
2,650	8	55–100	4–10	47	600	132,500	3½
420	6	48–100	4–10	32	395	13,860	4

* See drawings.

The quantities indicated in the above bill are to be considered approximate only, and the United States hold the right to increase or diminish the same, not exceeding twenty (20) per cent. of the above amounts.

2. Pipes and castings shall be delivered on either of the wharves in the District of Columbia, or on the cars at either railroad depot in the city of Washington, as ordered by the United States engineer. The contractor shall send with each shipment a schedule, giving the number and weight of each pipe and special casting sent at that time.

3. Every pipe shall have cast upon it, in letters from two (2) to two and one-half (2½) inches long and one-eighth (⅛) inch relief, the initials of the maker's name, the year in which it is cast, and the number, in regular series, in point of time of its casting, thus: A, B, C, 1883—1; A, B, C, 1883—2, etc.; each size of pipe to have its own series of numbering. Special castings shall have similarly the maker's initials, year of casting, and serial number.

4. Straight pipe must be made of such length as to lay at least twelve (12) feet; in each section they shall be made with hub and spigot joint, which, together with all branches and special castings, shall accurately conform in shape and dimensions to the drawings furnished by the United States engineer and his instructions, from time to time. No pipes or castings will be accepted which are defective in joint room from any cause. Lugs shall be cast on any or all connections and special castings, as may be ordered by the United States engineer. No pipes will be received that are more than the permitted deviation below the specified weights. For any excess above the deviation allowed no payment will be made.

5. The metal shall be such as to afford the best quality of cast-iron pipe—strong, tough, and of sound, even grain, and such as will satisfactorily admit of cutting and drilling.

6. All pipes shall be cast vertically, with the hub end down. They shall be free from all defects and imperfections. They shall be truly cylindrical in the bore, with the inner and outer surfaces concentric; straight in the axis for straight pipe, and true to the required curvature or form in the axis of the other pipes, and shall be internally and externally of the full specified dimensions.

7. The pipes and castings shall be carefully cleaned, without the use of acids or liquids, and then subjected to a careful hammer inspection. They shall then be thoroughly coated, while at a temperature of 300° F., with a preparation of coal-pitch

varnish, which shall be of such character as shall make a smooth coati tenacious when cold, and not brittle or with a tendency to scale off.

8. Each pipe or casting shall remain in the bath at least thirty (30) until the pipe or casting and pitch have an entirely equal temperature ordered by the United States engineer.

9. After being carefully drained of surplus pitch, they shall, in the p inspector, to be appointed by the United States engineer in charge, be s hydraulic pressure of three hundred (300) pounds per square inch, and inspection while under this pressure, and, if the United States engineer they shall be further subjected to a similar test after their delivery on before a final acceptance.

10. The pipes and castings shall be weighed for payment after the a the coal-pitch, and the weight shall be painted conspicuously in white o If the United States engineer shall so decide, the pipes and castings sha after delivery in Washington, and the weights so ascertained shall be use settlement of the contract. The ton used shall be the gross ton of twe dred and forty (2240) pounds.

11. All tools, materials, men, and expenses necessary for the proper inspection, and weighing in the shops, and for the delivery of the pipes as hereinbefore required, shall be furnished by and at the cost of the co including, however, the salary of the inspector appointed by the Unit gineer, for any part of the period covered by the contract; but if the se inspector should be required for a longer period, because of default on t contractor, his salary for such additional time will be deducted from any may be, or become, due said contractor.

12. The whole process of the manufacture of the pipes and castings a at all times to the inspection of the United States engineer. Specimen c metal used, suitable for a testing machine, shall be made when desired such castings must bear a tensile strain of sixteen thousand (16,000) poun inch. He shall have power to prevent the use of any metal, mould, or c his opinion may not be proper for the purpose for which it is intended spect and approve, or reject, the process of cleaning and testing the pi aration and application of the pitch varnish; and, in general, the fo formity, and condition of all pipes. On all these questions the decision States engineer shall be final, and he may further reject, without proving which is not in conformity with the specifications and drawings furnish

13. All pipes and castings contracted for must be finally found in all r and conformable to the foregoing requirements. The several inspection lieve the contractor of any of his obligations in this respect, and any de or other castings, which may have passed inspection at the foundery, will be at all times liable to rejection when discovered, until the final ad completion of the contract.

14. The delivery of the pipe and castings shall commence on or befor of October, 1883, and shall continue at an uniform rate until the 31st d ber, 1883, when the delivery of the entire amount under each and every be completed. The various sizes, classes, and special castings shall be such order and at such times as may be required by the United States e

15. Payments will be made on or before the tenth day of each month and castings received and accepted in proper order and condition and i with these specifications during the previous calendar month, less tw cent. of the amount found due, to be reserved until the satisfactory com contract.

16. To prevent disputes and litigation, it is expressly understood that of the United States engineer shall be final as to the acceptance or rej pipe or casting delivered on the work, and that he shall decide as to the intent of these specifications, or any obscurity in the wording of them; that he shall have the right to correct any errors or omissions in them the proper fulfillment of their intention; the action of such correction the time that the United States engineer gives due notice thereof.

17. The prices bid must cover the entire cost to the United States for castings finally accepted under the provisions of these specifications extra work or change due to any alteration or correction in said speci fair price to be paid shall be determined by the United States engine in writing by him at the time such extra work or change is ordered, claim for any payment above the regular contract price will be allowed claim for extra work be admitted if such work shall have been done with order from the United States engineer antedating the execution of the

18. Wherever the words United States engineer are used, they refer authorized agents limited to the particular duties entrusted to them in

PROPOSAL.

——— ———,
——— ———, 1883.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

SIR: In accordance with your advertisement of August 8, 1883, inviting proposals for cast-iron water-pipes and special castings for increasing the water supply of Washington, D. C., and subject to all the conditions and requirements thereof, and of your specifications of the same date, copies of both of which are hereto attached, and, so far as they relate to this proposal, are made a part of it, we (or I) propose to furnish the pipe and castings at the following prices, viz:

For seventy-five (75) inch cast-iron water-pipes, including special castings, at ——— (44) dollars and ——— (95) cents per ton.

For forty-eight (48) inch cast-iron water-pipes, including special castings, at ——— (——) dollars and ——— (——) cents per ton.

For twelve (12) inch cast-iron water-pipes, including special castings, at ——— (——) dollars and ——— (——) cents per ton.

For eight (8) inch cast-iron water-pipes, including special castings, at ——— (——) dollars and ——— (——) cents per ton.

For six (6) inch cast-iron water-pipes, including special castings, at ——— (——) dollars and ——— (——) cents per ton.

We (or I) make this proposal with a full knowledge of the kind, quantity, and quality of the pipes and castings required, and, if it is accepted, will, after receiving written notice of such acceptance, enter into contract within ten (10) days, with good and sufficient sureties for the faithful performance thereof.

(Signed) H. A. RAMSEY,
Vulcan Works, Baltimore, Md.

In case of a firm add names of partners: Doing business under the style of H. A. Ramsey & Co.

(Signed in triplicate.)

Bidder's bond.

Know all men by these presents, that we* ——— ———, of ———, as principal, and ———, of ———, and ——— of ———, as sureties, are held and bound unto the United States of America in the penal sum of twenty thousand dollars ($20,000), to the payment of which sum, well and truly to be made, we do bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents.

Given under our hands and seals this ——— day of ———, 1883.

The condition of this obligation is such that, whereas, the above bounden* ——— ———, in response to a public advertisement and notice, dated August 8, 1883, and given and published by Major G. J. Lydecker, Corps of Engineers, United States Army, ha— made and presented to Major G. J. Lydecker, Corps of Engineers, United States Army, a formal proposal, in writing, whereby — he — ha— proposed and agreed to enter into a contract with Major G. J. Lydecker, Corps of Engineers, United States Army, for furnishing cast-iron water-pipes and special castings, according to the terms and conditions set forth in said advertisement and notice.

Now, therefore, if the said* ——— ——— shall not withdraw† —— said proposal within sixty days from the date of opening the proposals, and shall within ten days from the date on which —— may be notified that —— said proposal has been accepted, and the said contract awarded to —— (provided such award be made within the sixty days above mentioned), duly and formally enter into such contract agreeably to the terms of —— said proposal, and into such bond for its due performance as shall be required of ——, or if ——— said proposal shall not be accepted and such contract not be awarded —— then this obligation shall be void, otherwise, that is to say, if either —— shall withdraw —— proposal within said sixty days, or fail to enter within said ten days into such contract if awarded —— and into such bond, to remain in full force, effect, and virtue.

Witnesses:

——— ——— ——— ———‡
——— ——— ——— ———‡
——— ——— ——— ———‡

(Executed in triplicate.)

* Insert full name of each bidder or partner.
† Fill remaining blanks with the words "he," "his," or "him," "they," "their," or "them," as the sense demands.
‡ Add seal of wax or wafer.

Justification of the sureties.

STATE OF ——,
County of ——, *ss:*

I, —— ——, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of —— thousand dollars ($——) over and above all my debts and liabilties.

(Signature of surety) —— ——

Before me,
(Signature of officer administering oath, with seal, if any) —— ——

STATE OF ——,
County of ——, *ss:*

I, —— ——, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of —— thousand dollars ($——) over and above all my debts and liabilities.

(Signature of surety) —— ——

Before me,
(Signature of officer administering oath, with seal, if any) —— ——

Certificate.

I, —— ——, do hereby certify that —— —— and —— ——, the sureties above named, are personally known to me, and that, to the best of my knowledge and belief, each is pecuniarily worth, over and above all his debts and liabilites, the sum stated in the accompanying affidavit subscribed by him.

(Signature of certifying official) —— ——

NOTE.—The certificate may be given separately as to each surety, and modified accordingly.

[Committee No. 51.]

Articles of agreement between Major Lydecker and the West Point Foundry Association for furnishing cast-iron water-pipe.

[Form 19 *a*.]

Articles of agreement entered into this 20th day of September, eighteen hundred and eighty-three (1883), between Major G. J. Lydecker, Corps of Engineers, U. S. Army, of the first part, and West Point Foundry Association, by G. Paulding, president, of Cold Springs, of the county of Putnam, State of New York, of the second part.

This agreement witnesseth that, in conformity with the advertisement and specifications hereunto attached, and which form a part of this contract, the said Major G. J. Lydecker, Corps of Engineers, for and in behalf of the United States of America, and the said West Point Foundry Association, for themselves, their heirs, executors, and administrators, have mutually agreed, and by these presents do mutually covenant and agree, to and with each other, as follows:

That the said party of the second part shall furnish and deliver in the city of Washington, District of Columbia, six hundred and eighty (680) lineal feet of seventy-five (75) inch cast-iron water-pipes for "increasing the water supply of Washington, D. C.," in full conformity with the requirements of the specifications above referred to. In consideration of the pipes being furnished and delivered as provided for above, the said party of the first part shall pay to the said party of the second part fifty-two dollars and fifty cents ($52.50) per gross ton of two thousand two hundred and forty (2,240) pounds.

The interlineation, seventy-five (75) inch, above is correct.

G. J. LYDECKER,
Major of Engineers, U. S. A.
G. PAULDING,
President West Point Foundry Association.

All materials furnished and work done under this contract shall, before being accepted, be subject to a rigid inspection by an inspector appointed on the part of the Government, and such as does not conform to the specifications set forth in this contract shall be rejected. The decision of the engineer officer in charge as to quality and quantity shall be final.

The said West Point Foundry Association shall commence delivering the pipe on or before the first (1st) day of November, eighteen hundred and eighty-three (1883), and shall complete the delivery of the same on or before the thirty-first (31st) day of December, eighteen hundred and eighty-three (1883).

If, in any event, the party of the second part shall delay or fail to commence with the delivery of the material or the performance of the work on the day specified herein, or shall, in the judgment of the engineer in charge, fail to prosecute faithfully and diligently the work in accordance with the specifications and requirements of this contract, then, in either case, the party of the first part, or his successor legally

appointed, shall have power, with the sanction of the Chief of Engineers, to annul this contract by giving notice in writing to that effect to the party (or parties, or either of them) of the second part; and, upon the giving of such notice, all money or reserved percentage due or to become due to the party or parties of the second part by reason of this contract shall be and become forfeited to the United States; and the party of the first part shall be thereupon authorized, if an immediate performance of the work or delivery of the materials be in his opinion required by the public exigency, to proceed to provide for the same by open purchase or contract, as prescribed in section 3709 of the Revised Statutes of the United States: *Provided, however*, that if the party (or parties) of the second part shall by freshets, ice, or other force or violence of the elements, and by no fault of his or their own, be prevented either from commencing or completing the work, or delivering the materials at the time agreed upon in this contract, such additional time may, in writing, be allowed him or them for such commencement or completion as, in the judgment of the party of the first part, or his successor, shall be just and reasonable; but such allowance and extension shall in no manner affect the rights or obligations of the parties under this contract, but the same shall subsist, take effect, and be enforceable precisely as if the new date for such commencement or completion had been the date originally herein agreed upon.

If, at any time during the prosecution of the work, it be found advantageous or necessary to make any change or modification in the project, and this change or modification should involve such change in the specifications as to character and quantity, whether of labor or material, as would either increase or diminish the cost of the work, then such change or modification must be agreed upon in writing by the contracting parties, the agreement setting forth fully the reasons for such change, and giving clearly the quantities and prices of both material and labor thus substituted for those named in the original contract, and before taking effect must be approved by the Secretary of War: *Provided*, That no payments shall be made unless such supplemental or modified agreement was signed and approved before the obligation arising from such modification was incurred.

No claim whatever shall at any time be made upon the United States by the party or parties of the second part for or on account of any extra work or material performed or furnished, or alleged to have been performed or furnished under or by virtue of this contract, and not expressly bargained for and specifically included therein, unless such extra work or materials shall have been expressly required in writing by the party of the first part or his successor, the prices and quantities thereof having been first agreed upon by the contracting parties and approved by the Chief of Engineers.

The party of the second part shall be responsible for and pay all liabilities incurred in the prosecution of the work for labor and material.

Payments shall be made to the said West Point Foundry Association when the pipe contracted for shall have been delivered and accepted, reserving twenty (20) per cent. from each payment until the whole amount shall have been so delivered and accepted.

Neither this contract nor any interest therein shall be transferred by the said West Point Foundry Association to any other party; and any such transfer shall cause the annulment of the contract so far as the United States are concerned. All rights of action, however, to recover for any breach of this contract by the said West Point Foundry Association are reserved to the United States.

No member of or delegate to Congress, nor any person belonging to, or employed in, the military service of the United States, is or shall be admitted to any share or part of this contract, or to any benefit which may arise herefrom.*

This contract shall be subject to approval of the Chief of Engineers, U. S. A.

In witness whereof the undersigned have hereunto placed their hands and seals the date first hereinbefore written.

G. J. LYDECKER, [SEAL.]
Major Eng'r, U. S. A.
WEST POINT FOUNDRY ASSOCIATION, [SEAL.]
By G. PAULDING, *Pres't.*

Witnesses:
SIMON NEWTON.
ELISHA NELSON,
S. F. BARROWS,
As to the signature of G. Paulding, pres'd't.

(Executed in quintuplicate.)

Approved October 16, 1883.

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

*NOTE.—Here add to any contract made with an incorporated company for its general benefit the following words, viz: "But this stipulation, as far as it relates to members of or delegates to Congress, is not to be construed to extend to this contract."—*See* sec. 3740, Revised Statutes.

* I do solemnly swear that the foregoing is an exact copy of a contract made by me personally with ——— ———; that I made the same fairly, without any benefit or advantage to myself, or allowing any such benefit or advantage corruptly to the said ——— ———, or any other person, and that the papers accompanying include all those relating to the said contract as required by the statute in such case made and provided.

———— ————,
——— *of Engineers.*

Subscribed and sworn to before me this —— day of ———, ——.

———— ————,
———— ————.

NOTE.—The copy of contract for the Bureau must be accompanied with an abstract of the bids, and copy of each bid and advertisement unless previously furnished.- *See* G. O. No. 72, A. G. O. of 1879. Par. XII, p. 3.

[Committee No. 52.]

Articles of agreement between Major Lydecker and Andrew H. McNeal for furnishing cast-iron water-pipes and special castings.

[Form 19.]

Articles of agreement entered into this 20th day of September, eighteen hundred and eighty-three (1883), between Major G. J. Lydecker, Corps of Engineers, U. S. Army, of the first part, and Andrew H. McNeal, of Burlington, of the county of Burlington, State of New Jersey, of the second part:

This agreement witnesseth that, in conformity with the advertisement and specifications hereunto attached, and which form a part of this contract, the said Major G. J. Lydecker, Corps of Engineers, for and in behalf of the United States of America, and the said Andrew H. McNeal, for himself, his heirs, executors, and administrators, have mutually agreed, and by these presents do mutually covenant and agree, to and with each other, as follows:

That the said party of the second part shall furnish and deliver in the city of Washington, District of Columbia, cast-iron water-pipes for "increasing the water supply of Washington, D. C.," in full conformity with the requirements of the specifications above referred to, of sizes and in amounts approximately as follows: Six thousand seven hundred (6,700) lineal feet of forty-eight (48) inch pipe; one thousand and sixty (1,060) lineal feet of twelve (12) inch pipe; two thousand six hundred and fifty (2,650) lineal feet of eight (8) inch pipe; and four hundred and twenty (420) lineal feet of six (6) inch pipe; together with special castings for the same in forms and numbers as shown by drawings in the office of the Washington Aqueduct and as required by the aforesaid party of the first part. In consideration of the pipes and castings being furnished and delivered as provided for above, the said party of the first part shall pay to the said party of the second part as follows: For forty-eight (48) inch cast-iron water-pipes and special castings, thirty-five dollars and twenty cents ($35.20) per gross ton of 2,240 pounds; for twelve (12) inch cast-iron water-pipes and special castings, forty dollars ($40) per gross ton of 2,240 pounds; for eight (8) inch cast-iron water-pipes and special castings, forty-one dollars ($41) per gross ton of 2,240 pounds; for six (6) inch cast-iron water-pipes and special castings, forty-two dollars ($42) per gross ton of 2,240 pounds.

All materials furnished and work done under this contract shall, before being accepted, be subject to a rigid inspection by an inspector appointed on the part of the Government, and such as does not conform to the specifications set forth in this contract shall be rejected. The decision of the engineer officer in charge as to quality and quantity shall be final.

The said Andrew H. McNeal shall commence delivering the pipe on or before the first (1st) day of October, eighteen hundred and eighty-three (1883), and shall complete the delivery of the same on or before the first (1st) day of March, eighteen hundred and eighty-four (1884).

If, in any event, the party of the second part shall delay or fail to commence with the delivery of the material or the performance of the work on the day specified herein, or shall, in the judgment of the engineer in charge, fail to prosecute faithfully and diligently the work in accordance with the specifications and requirements of this contract, then, in either case, the party of the first part, or his successor legally appointed, shall have power, with the sanction of the Chief of Engineers, to annul

* NOTE.—This affidavit is required only on the quintuplicate copy of contract intended for the returns office, Department of the Interior.

this contract by giving notice in writing to that effect to the party (or parties, or either of them) of the second part; and, upon the giving of such notice, all money or reserved percentage due or to become due to the party or parties of the second part by reason of this contract shall be and become forfeited to the United States; and the party of the first part shall be thereupon authorized, if an immediate performance of the work or delivery of the materials be in his opinion required by the public exigency, to proceed to provide for the same by open purchase or contract, as prescribed in section 3709 of the Revised Statutes of the United States: *Provided, however*, That if the party (or parties) of the second part shall by freshets, ice, or other force or violence of the elements, and by no fault of his or their own, be prevented either from commencing or completing the work, or delivering the materials at the time agreed upon in this contract, such additional time may, in writing, be allowed him or them for such commencement or completion as, in the judgment of the party of the first part, or his successor, shall be just and reasonable; but such allowance and extension shall in no manner affect the rights or obligations of the parties under this contract, but the same shall subsist, take effect, and be enforceable precisely as if the new date for such commencement or completion had been the date originally herein agreed upon.

If, at any time during the prosecution of the work, it be found advantageous or necessary to make any change or modification in the project, and this change or modification should involve such change in the specifications as to character and quantity, whether of labor or material, as would either increase or diminish the cost of the work, then such change or modification must be agreed upon in writing by the contracting parties, the agreement setting forth fully the reasons for such change, and giving clearly the quantities and prices of both material and labor thus substituted for those named in the original contract, and before taking effect must be approved by the Secretary of War: *Provided*, That no payments shall be made unless such supplemental or modified agreement was signed and approved before the obligation arising from such modification was incurred.

No claim whatever shall at any time be made upon the United States by the party or parties of the second part for or on account of any extra work or material performed or furnished, or alleged to have been performed or furnished under or by virtue of this contract and not expressly bargained for and specifically included therein, unless such extra work or materials shall have been expressly required in writing by the party of the first part or his successor, the prices and quantities thereof having been first agreed upon by the contracting parties and approved by the Chief of Engineers.

The party of the second part shall be responsible for and pay all liabilities incurred in the prosecution of the work for labor and material.

Payments shall be made to the said Andrew H. McNeal when the pipe and castings contracted for shall have been delivered and accepted, reserving twenty (20) per cent. from each payment until the whole amount shall have been so delivered and accepted.

Neither this contract nor any interest therein shall be transferred by the said Andrew H. McNeal to any other party; and any such transfer shall cause the annulment of the contract so far as the United States are concerned. All rights of action, however, to recover for any breach of this contract by the said Andrew H. McNeal are reserved to the United States.

No member of or delegate to Congress, nor any person belonging to, or employed in, the military service of the United States, is or shall be admitted to any share or part of this contract, or to any benefit which may arise herefrom.*

This contract shall be subject to approval of the Chief of Engineers, U. S. A.

In witness whereof the undersigned have hereunto placed their hands and seals the date first hereinbefore written.

G. J. LYDECKER, [SEAL.]
Major Engrs., U. S. A.
ANDREW H. MCNEAL. [SEAL.]

Witnesses:
SIMON NEWTON.
EDWARD L. OWEN.

(Executed in quintuplicate.)
Approved October 6, 1883.

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

* NOTE.—Here add to any contract made with an incorporated company for its general benefit the following words, viz: "But this stipulation, so far as it relates to members or of delegates to Congress, is not to be construed to extend to this contract."—*See* sec. 3740, Revised Statutes.

* I do solemnly swear that the foregoing is an exact copy of a contract made by me personally with ——— ———; that I made the same fairly, without any benefit or advantage to myself, or allowing any such benefit or advantage corruptly to the said ——— ———, or any other person; and that the papers accompanying include all those relating to the said contract as required by the statute in such case made and provided.

———— ————,
——— *of Engineers.*

Subscribed and sworn to before me this —— day of ———.

———— ————,
———— ————.

NOTE.—The copy of contract for the Bureau must be accompanied with an abstract of the bids, and copy of each bid and advertisement, unless previously furnished.—*See* G. O. No. 72, A. G. O., of 1879, par. XII, p. 3.

[Committee No. 53.]

Lydecker, Maj. G. J., transmits abstract and bids for reservoir construction for increasing the water supply of Wash'n, D. C.; recommends award to the lowest bidders, Patrick Maloney and Andrew Gleason, being responsible.

OFFICE OF WASHINGTON AQUEDUCT,
Washington, D. C., October 13, 1883.

Brig. General H. G. WRIGHT,
Chief of Engineers, U. S. A., Washington, D. C.:

GENERAL: I have the honor to transmit herewith abstract of bids for reservoir construction for increasing the water supply of Washington, D. C., received and opened October 5, 1883, together with one copy of each proposal offered.

The lowest bidders are Patrick Maloney and Andrew Gleason.

As on examination and full inquiry it appears that they are responsible bidders and properly qualified to do the work, I recommend that the contract for construction of reservoir be awarded to them.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 54.]

Abstract of proposals received and opened October 5, 1883, *for construction of reservoir for increasing the water supply of Washington, D. C.*

No.	Name.	Residence.	Excavation, 695,000 cu. yds.	Puddling, 54,000 cu. yds.	Sodding, 20,000 sq. yds.	Cut-stone masonry, 12 cu. yds.	Brick masonry, 250 cu. yds.	Concrete masonry, 3,500 cu. yds.	Rubble masonry, 100 cu. yds.
1	Patrick Maloney and Andrew Gleason.	Washington, D. C.	$0.30	$0.40	$0.20	$15.00	$9.00	$3.50	$6.00
2	Gilbert Peterson..	Lockport, N. Y...	.28	.11	.30	19.00	9.66	4.20	4.00
3	Robert S. Johnston.	Trenton, N. J.....	.33	.66	.45	12.00	12.00	3.00	2.00
4	Dowling, Kennedy & Co.	New York, N. Y..	.24	1.00	.25	25.00	13.00	5.50	7.00
5	James Archbald..	Scranton, Pa.....	.33	.40	.30	15.00	12.00	5.00	6.00
6	Eugene Robinson	Detroit, Mich.....	.29	.82	.32	20.00	13.52	9.50	3.00
7	John W. Rutherford.	Hoboken, N. J....	.41	.12	.20	80.00	15.00	5.00	12.00
8	Stephens, Gere & Co.	Syracuse, N. Y ...	.37	.30	.25	40.00	12.50	5.50	6.00
9	Albert Gleason & Co.	Washington, D. C.	.39	.39	.50	15.00	8.50	4.75	5.00
10	Henry L. Cranford.	Washington, D. C	.36	.90	.20	30.00	10.00	4.00	5.00
11	John E. Lyons & Co.	Baltimore, Md....	.34	.72	.48	32.40	13.20	3.60	2.40
12	Charles Hart.....	Brooklyn, N. Y...	.39	2.50	.20	20.00	7.30	5.30	5.50
13	Beckwith & Quackenbush.	Mohawk, N. Y....	.40	.90	.25	40.00	14.00	4.00	6.00
14*	J. H. Dewees & Co.	Washington, D. C.	.33	.35	.25	20.00	12.00	4.00	10.00
15†	Hoope's Artificial Stone Co.	Baltimore, Md....	.40	.20	.50	12.00	14.00	12.00	3.00

*NOTE.—This affidavit is required only on the quintuplicate copy of contract intended for the returns office, Department of the Interior.

Abstract of proposals received and opened October 5, 1883, *etc.*—Continued.

No.	Name.	Residence.	Trap-rock lining in cement, 1,400 sq. yds.	Broken-stone lining, 8,000 cu. yds.	Paving, 80,000 sq. yds.	Coping, 95 lineal feet.	Cast-iron drains, 3,100 lin. ft.	Aggregate cost of items in approximate bill.
1	Patrick Maloney and Andrew Gleason.	Washington, D. C.	$1.00	$2.00	$0.28	$5.00	$0.75	$298,980.00
2	Gilbert Peterson.....	Lockport, N. Y ...	3.00	1.00	1.08	2.50	.12	323,512.50
3	Robert S. Johnston ...	Trenton, N. J.....	1.45	1.25	.50	6.00	.20	341,054.00
4	Dowling, Kennedy & Co.	New York, N. Y..	4.00	2.00	1.00	2.00	.40	352,335.00
5	James Archbald.....	Scranton, Pa.....	2.00	2.50	.75	3.00	.50	362,865.00
6	Eugene Robinson.....	Detroit, Mich.....	1.15	2.10	.80	4.00	.38	373,683.00
7	John W. Rutherford..	Hoboken, N. J....	2.00	2.50	.45	10.00	1.00	381,690.00
8	Stephens, Gere & Co..	Syracuse, N. Y....	3.25	2.50	.90	1.50	.10	398,807.50
9	Albert Gleason & Co..	Washington, D. C.	1.50	1.50	.78	5.00	‡.68	400,623.00
10	Henry L. Cranford....	Washington, D. C.	3.00	1.50	.78	4.00	1.00	402,240.00
11	John E. Lyons & Co ..	Baltimore, Md....	1.20	1.20	1.20	4.80	.30	409,974.80
12	Charles Hart	Brooklyn, N. Y ...	1.80	2.25	.85	6.00	.50	521,855.00
13	Beckwith & Quackenbush.	Mohawk, N. Y....	1.00	2.60	2.00	2.00	.30	533,500.00
14*	J. H. Dewees & Co....	Washington, D. C.	8.00	1.75	.70	2.55	.....	.....
15†	Hoope's Artificial Stone Co.	Baltimore, Md....	.....	.....	1.25	.....	.20	.....

* Bid does not cover the entire work.
† Bid does not cover the entire work, and is predicated on the use of Hoope's artificial stone. It should not be considered.
‡ Two proposals state price 60c.

Respectfully submitted.

G. J. LYDECKER,
Major of Engineers, U. S. A.

OFFICE WASHINGTON AQUEDUCT,
Washington, D. C., October 13, 1883.

[Committee No. 55.]

Proposal of Patrick Maloney and Andrew Gleason, Washington, D. C., for construction of reservoir for increasing water supply of Washington, D. C.

ITEMS OF PROPOSAL.

For excavation, etc	per cu. yd..	$0.30
For puddling, etc	do....	.40
For sod, soil, etc	per sq. yd..	.20
For cut-stone masonry	per cu. yd..	15.00
For brick masonry and lining of conduit	do....	9.00
For concrete masonry (except stone)	do....	5.50
For rubble masonry (except stone)	do....	6.00
For trap-rock lining of conduits in cement	per sq. yd..	1.00
For broken-stone lining	per cu. yd..	2.00
For paving	per sq. yd..	.28
For coping	per lin. ft..	5.00
For iron drains	do....	.75

NOTE.—No extra copies of the printed specifications and proposals being on hand it is impracticable to make exact copies.

[Committee No. 56.]

Proposal of Gilbert Peterson, Lockport, N. Y., for construction of re
the water supply of Washington, D. C.

ITEMS OF PROPOSAL.

For excavation, etc
For puddling, etc
For sod, soil, etc
For cut-stone masonry
For brick masonry, including lining of conduits
For concrete masonry (except stone)
For rubble masonry (except stone)
For trap-rock lining of conduits in cement
For broken-stone lining
For paving
For coping
For iron drains

NOTE.—No extra copies of the printed specifications and prop
it is impracticable to make exact copies.

[Committee No. 57.]

Proposal of Robert S. Johnston, Trenton, N. J., for construction of re
the water supply of Washington, D. C.

ITEMS OF PROPOSALS.

For excavation, etc
For puddling, etc
For sod, soil, etc
For cut-stone masonry
For brick masonry and lining of conduits
For concrete masonry (except stone)
For rubble masonry (except stone)
For trap-rock lining of conduits in cement
For broken-stone lining
For paving
For coping
For iron drains

[Committee No. 58.]

Proposal of Dowling, Kennedy & Co., New York, N. Y., for constru
increasing water supply of Washington, D. C.

ITEMS OF PROPOSALS.

For excavation, etc
For puddling, etc
For sod, soil, etc
For cut-stone masonry
For brick masonry and lining of conduits
For concrete masonry (except stone)
For rubble masonry (except stone)
For trap-rock lining of conduits in cement
For broken-stone lining
For paving
For coping
For iron drains

[Committee No. 59.]

Proposal of James Archbald, Scranton, Pa., for construction of reservoir for increasing the water supply of Washington, D. C.

ITEMS OF PROPOSAL.

For excavation, etc	per cu. yd	$0.33
For puddling, etc	do	.40
For sod, soil, etc	per sq. yd	.30
For cut-stone masonry	per cu. yd	15.00
For brick masonry and lining of conduits	do	12.00
For concrete masonry (except stone)	do	5.00
For rubble masonry (except stone)	do	6.00
For trap rock lining of conduits in cement	per sq. yd	2.00
For broken-stone lining	per cu. yd	2.50
For paving	per sq. yd	.75
For coping	per lin. ft	3.00
For iron drains	do	.50

[Committee No. 60.]

Proposal of Eugene Robinson, Detroit, Mich., for construction of reservoir for increasing the water supply of Washington, D. C.

ITEMS OF PROPOSAL.

For excavation, etc	per cu. yd	$0.29
For puddling, etc	do	.82
For sod, soil, etc	per sq. yd	.32
For cut-stone masonry	per cu. yd	.20
For brick masonry and lining of conduits	do	13.52
For concrete masonry (except stone)	do	9.59
For rubble masonry (except stone)	do	3.00
For trap-rock lining of conduits in cement	per sq. yd	1.15
For broken-stone lining	per cu. yd	2.10
For paving	per sq. yd	.80
For coping	per lin. ft	4.00
For iron drains	do	.38

[Committee No. 61.]

Proposal of John W. Rutherford, Hoboken, N. J., for construction of reservoir for increasing the water supply of Washington, D. C.

ITEMS OF PROPOSAL.

For excavation, etc	per cu. yd	$0.41
For puddling, etc	do	.12
For sod, soil, etc	per sqr. yd	.20
For cut-stone masonry	per cu. yd	80.00
For brick masonry, and lining of conduits	do	15.00
For concrete masonry (except stone)	do	5.00
For rubble masonry (except stone)	do	12.00
For trap-rock lining of conduits in cement	per sq. yd	2.00
For broken-stone lining	per cu. yd	2.50
For paving	per sq. yd	.45
For coping	per lin. ft	10.00
For iron drains	do	1.00

[Committee No. 62.]

Proposal of Stephens, Gere & Co., Syracuse, N. Y., for construction of reservoir for increasing the water supply of Washington, D. C.

ITEMS OF PROPOSAL.

For excavation, etc	per cu. yd.	$0.37
For puddling, etc	do	.30
For sod, soil, etc	per sq. yd.	.25
For cut-stone masonry	per cu. yd.	40.00
For brick masonry and lining of conduits	do	12.50
For concrete masonry (except stone)	do	5.50
For rubble masonry (except stone)	do	6.00
For trap-rock lining of conduits in cement	per sq. yd.	3.25
For broken-stone lining	per cu. yd.	2.50
For paving	per sq. yd.	.90
For coping	per lin. ft.	1.50
For iron drains	do	.10

[Committee No. 63.]

Proposal of Albert Gleason & Co., Washington, D. C., for construction of reservoir for increasing the water supply of Washington, D. C.

ITEMS OF PROPOSAL.

For excavations, etc	per cu. yd.	$0.39
For puddling, etc	do	.30
For sod, soil, etc	per sq. yd.	.50
For cut-stone masonry	per cu. yd.	15.00
For brick masonry and lining of conduits	do	8.50
For concrete masonry (except stone)	do	4.75
For rubble masonry (except stone)	do	5.00
For trap-rock lining of conduits in cement	per sq. yd.	1.50
For broken-stone lining	per cu. yd.	1.50
For paving	per sq. yd.	.75
For coping	per lin. ft.	5.00
For iron drains	do	.65

[Committee No. 64.]

Proposal of Henry L. Cranford, Washington, D. C., for construction of reservoir for increasing the water supply of Washington, D. C.

ITEMS OF PROPOSALS.

For excavation, etc	per cu. yd.	$0.36
For puddling, etc	do	.90
For sod, soil, etc	per sq. yd.	.20
For cut-stone masonry	per cu. yd.	30.00
For brick masonry, and lining of conduits	do	10.00
For concrete masonry (except stone)	do	4.00
For rubble masonry (except stone)	do	5.00
For trap-rock lining of conduits in cement	per sq. yd.	3.00
For broken-stone lining	per cu. yd.	1.50
For paving	per sq. yd.	.75
For coping	per lin. ft.	4.00
For iron drains	do	1.00

[Committee No. 65.]

Proposal of John E. Lyons & Co., Baltimore, Md., for construction of reservoir for increasing the water supply of Washington, D. C.

ITEMS OF PROPOSAL.

For excavation, etc	per cu. yd..	$0.34
For puddling, etc	do....	.72
For sod and soil	per sq. yd..	.48
For cut-stone masonry	per cu. yd..	32.40
For brick masonry and lining of conduits	do....	13.20
For concrete masonry (except stone)	do....	3.60
For rubble masonry (except stone)	do....	2.40
For trap-rock lining of conduits in cement	per sq. yd..	1.20
For broken-stone lining	per cu. yd..	1.20
For paving	per sq. yd..	1.20
For coping	per lin. ft..	4.80
For iron drains	do....	.30

[Committee No. 66.]

Proposal of Charles Hart, Brooklyn, N. Y., for construction of reservoir for increasing the water supply of Washington, D. C.

ITEMS OF PROPOSAL.

For excavation, etc	per cu. yd..	$0.39
For puddling, etc	do....	2.50
For sod, soil, etc	per sq. yd .	.20
For cut-stone masonry	per cu. yd..	20.00
For brick masonry and lining of conduits	do....	7.30
For concrete masonry (except stone)	do....	5.30
For rubble masonry (except stone)	do....	5.50
For trap-rock lining of conduits in cement	per sq. yd..	1.80
For broken-stone lining	per cu. yd..	2.25
For paving	per sq. yd..	.85
For coping	per lin. ft..	6.00
For iron drains	do....	.50

[Committee No. 67.]

Proposal of Beckwith & Quackenbush, Mohawk, N. Y., for construction of reservoir for increasing the water supply of Washington, D. C.

ITEMS OF PROPOSAL.

For excavation, etc	per cu. yd..	$0.40
For puddling, etc	do....	.90
For sod, soil, etc	per sq. yd..	.25
For cut-stone masonry	per cu. yd..	40.00
For brick masonry and lining of conduit	do....	14.00
For concrete masonry (except stone)	do....	4.00
For rubble masonry (except stone	do ...	6.00
For trap-rock lining of conduits in cement	per sq. yd..	1.00
For broken-stone lining	per cu. yd..	2160
For paving	per sq. yd..	2.00
For coping	per lin. ft..	2.00
For iron drains	do....	.30

[Committee No. 68.]

Proposal of J. H. Dewees & Co., Washington, D. C., for construction of reservoir for increasing the water supply of Washington, D. C.

ITEMS OF PROPOSALS.

For excavation, etc	per cu. yd...	$0.33
For puddling, etc	do....	.35
For sod, soil, etc	per sq. yd..	.25
For cut-stone masonry	per cu. yd..	20.00
For brick masonry and lining of conduits	do....	12.00
For concrete masonry (except stone)	do....	4.00
For rubble masonry (except stone)	do....	10.00
For trap-rock lining of conduits in cement	per sq. yd..	8.00
For broken-stone lining	per cu. yd..	1.75
For paving	per sq. yd..	.70
For coping	per lin. ft..	2.55
For iron drains		

[Committee No. 69.]

Proposals of Hoopes Artificial Stone Company, for construction of reservoir for increasing the water supply of Washington, D. C.

ITEMS OF PROPOSALS.

For excavation, etc	per cu. yd..	$0.40
For puddling, etc	do....	.30
For sod, soil, etc	per sq. yd..	.50
For cut-stone masonry (Hoopes beton coignet)	per cu. yd..	12.00
For Hoopes stone and lining of conduit	do....	14.00
For concrete masonry (except stone)	do....	12.00
For rubble masonry (except stone)	do....	3.00
For trap-rock lining of conduits in cement		
For broken-stone lining		
For paving	per sq. yd..	1.25
For coping		
For iron drains	per lin. ft..	.20

[Committee No. 70.]

Advertisement, instructions, specifications, proposals, and bidder's bond for construction of reservoir for increasing the water supply of Washington, D. C.

[Advertisement.]

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., August 29, 1883.

Sealed proposals, in triplicate, for the work required for increasing the water supply of the city of Washington, in accordance with the act of Congress approved July 15th, 1882, will be received at this office until 12 o'clock noon, on Friday, October 5th, 1883, when they will be publicly opened; the work to be done comprises three different classes, viz.:

* * * * * * *

Class C—Reservoir construction.—This work will consist mainly of earth excavation and embankment, the purpose being to construct a reservoir capable of containing 300,000,000 gallons.

Separate proposals, in triplicate, must be made for each class. Parties proposing to bid will apply at this office for blanks for proposals, specifications, and all information, being careful to state for which class or classes of work blanks are desired; but they will be furnished only to such parties as show *prima facie* evidence that they are able, financially and by experience, to undertake the work on which they propose to bid.

Each bidder must submit with his proposals written evidence on which he relies to establish his capacity to perform the work, reference being had to his experience on work of like character, to the plant at his disposal and which he proposes to use, and to his financial ability to do all that is necessary for a rapid prosecution of the work. Before proposals are opened each bidder must certify to the undersigned that either personally or by a duly authorized agent he has inspected the natural features of the locality in which the work is located and examined the drawings on file in this office.

The right is reserved to reject any and all bids or parts of bids.

G. J. LYDECKER,
Major of Engineers, U. S. A.

General instructions for bidders.

1. All proposals must be in triplicate, on the accompanying form. They must be enclosed in a sealed envelope, and endorsed "Proposals for Construction of Reservoir." This parcel should then be placed inside a second envelope, and be addressed to *Office of the Washington Aqueduct, Georgetown Station, Washington, D. C.* No responsibility shall attach to the officer in charge for the premature opening of any proposal not endorsed as above directed.

2. The bidder's bond, executed in triplicate, must be signed by two (2) responsible sureties in the sum of sixty thousand dollars ($60,000), to be certified to as good and sufficient sureties by a United States district attorney, collector of customs, or any other officer under the United States Government, or responsible person known to this office.

3. A firm will not be accepted as a surety, nor will a partner be accepted as surety for a co-partner or for a firm of which he is a member.

4. An officer of a corporation will not be accepted as surety for such corporation.

5. Where firms bid, the individual names of the members should be written out, and should be signed in full, giving the Christian names; but the signers may, if they choose, describe themselves, in addition, as doing business under a given name and style as a firm.

6. Signatures of obligor and sureties to bidder's bond must have affixed to them seals of wax or wafer.

7. The place of residence of every bidder, with county and State, must be given after his signature, which must be written in full.

8. Any one signing a proposal as the agent of another, or of others, must file with it legal evidence of his authority so to do.

9. Alterations by erasures or interlineations should be explained or noted in the proposal over the signature of the bidder.

10. If a bidder wishes to withdraw his proposal, he may do so before the time fixed for the opening, without prejudice to himself, by communicating his purpose in writing to the officer who holds it, and when his proposal is reached, it will be handed to him or his authorized agent, unread.

11. All prices must be written as well as expressed in figures.

12. The contract which the bidder promises to enter into shall be in the form adopted and in use by the Engineer Department of the Army, blank forms of which can be inspected at this office. Parties making bids are to be understood as accepting the terms and conditions contained in such form of contract.

13. Reasonable grounds for supposing that any bidder is interested in more than one bid for the same item will cause the rejection of all bids in which he is interested.

14. The United States reserves the right to reject any and all bids; also to disregard the bid of any *failing bidder or contractor*, known as such to the Engineer Department.

15. The bidder must satisfy the United States Engineer in charge of his ability to furnish the materials or perform the work for which he bids. The character of the machinery to be used and the capacity and standing of the bidder will be considered in making the award.

16. Transfers of contracts or of interests in contracts are prohibited by law.

17. Bidders are invited to be present at the opening of the bids.

SPECIFICATIONS.

1.—*General description of work.*

The work to be done is the construction of a reservoir capable of containing no less than three hundred million (300,000,000) gallons of water, and will consist principally of earth excavation and embankment; the amount of excavation will approximate six hundred and ninety-five thousand (695,000) cubic yards, the greater part of which will be placed in embankment to form the dam across the valley in which the reservoir is to be located.

The east working shaft of the tunnel is located within the limits and in case of separate awards the contractors will be required respective works in such manner as not to interfere with each ot the contractor for the reservoir will commence work by excavating to the prescribed lines and slopes, and in the shortest time possible c vation for a distance of five hundred (500) feet above the shaft. from the tunnel will be deposited by the contractor for the same wi and will be hauled thence, sorted and piled by the reservoir contract use on his work. The tunnel contractor will remove and pile, withi designated, such stone as he may require for lining his work on this of conflict between the contractors on any matter affecting the pr works the United States engineer shall act as arbitrator, and his binding on both parties.

In order to divert the water of the creek now flowing across the site vide for the drainage of the reservoir, and intercept the surface wa rounding country, the contractor will be required to construct the n conduits, iron-pipe drains, and side flood channels, all as hereinaft shown upon the plans and drawings to which these specifications re

At the outset the contractor will be required to clear the buildi &c., from the area included within the flow line of the reservoir ar dam, side channels, or the auxiliary works; he will also remove th such depth as may be required, and preserve the same for use on the and elsewhere on the work.

No specific payment will be made for clearing the site of the w quired, but its cost will be included in the price paid for excavation

2.—*Trenches for conduits.*

The trenches in which the conduits for diverting the water of t built will be open cuts with vertical sides, which must be thorough and sheet-piled, as may be necessary to prevent any caving or slide

For the west side conduit the clear space inside of the longitu not be less than seven and one-half (7½) feet wide and the clear i the cross braces will be not less than thirteen (13) feet, with a clear the extrados of the arch and the lower braces of seven (7) feet. Wh been excavated and its sides secured to the satisfaction of the Unit (but not before this) the work of constructing the masonry con described, will be commenced.

The timber used in the bracing, shoring, and sheet-piling will be l the iron main, to be laid by the United States in the same trench, h position and all work in connection therewith been completed. Th be removed and the trench refilled. For a distance of fifty (50) fe extremity, next the reservoir, the filling will be done with selected rammed in layers of six (6) inches depth. For the rest of the line refilled with material taken out of it; it will be placed in layers ten (10) inches, and sufficiently rammed to prevent subsequent s that part of the trench for the west side conduit which is to rece main the surface of the ground west of the trench will be kept fr vated material or other matter, and left clear for handling the mai material may be taken to the dam and replaced from the general e

3.—*Cast-iron drains.*

These will comprise about four hundred (400) lineal feet, twel diameter, twenty-six hundred and fifty (2,650) lineal feet, eight (eter, and four hundred and twenty (420) lineal feet six (6) inches i be laid in concrete, as shown by plans and sections. The pipe w about twelve (12) feet long, and will be delivered to the contracto reservoir, by the United States. Each section will be laid at the p a bed of cement mortar, one (1) inch thick, after the concrete fou built up to one-fourth (¼) the height of the diameter of the pipe. each section of pipe will be carefully inserted into the bell of the so that the sections will abut properly against each other, with u around the circumference of pipe for leading and calking the joints. calking will be done with material furnished and by skilled labo United States engineer, and the pipes will then be tested by wat the supervision of the United States engineer. Proper facilities f be afforded by the contractor. The remainder of the concrete will rammed around and above the pipe, so as to insure perfect contac

the surplus mortar of the concrete. The pipes will then be again tested as provided above.

If any pipe should be broken or injured after delivery upon the site of the reservoir, all loss or damage arising therefrom will be charged to the contractor and deducted from any amount that may be due, or may become due, him under this contract.

4.—Flood-channels and by wash.

These will be constructed by excavation and embankment, of dimensions shown on plans; the embankment will be composed of non-permeable material, such as clay or clayey gravel, and placed in layers of six (6) inches, thoroughly compacted by ramming; if material of the required quality is not furnished by the adjacent excavation it must be obtained from the general excavation for the reservoir. The bed of the embankments must be firm and solid, and cut into steps, if deemed necessary by the United States engineer.

5.—Excavation sand embankments.

General requirements.—The excavation and embankment will be carried on with such sufficient force and adequate plant as is necessary, in the opinion of the United States engineer, to secure the greatest possible progress, and the contractor will be required to conduct all operations in such manner, and at such points, as to secure at each stage of the work the material required for the proper construction of the dam. All excavations and embankments must be strictly confined to the prescribed limits, and finished accurately to conform to the designated slopes, all of which will be defined and marked on the ground under the direction of the United States engineer. No allowance will be made for any excavation or embankment outside of, or beyond, these limits and slopes.

Slopes.—The side slope of the reservoir in excavation will have one (1) foot perpendicular to two (2) feet base, unless the material should require a flatter one for stability; the side slopes of the reservoir in embankment will have not less than three (3) feet base to one (1) foot perpendicular.

Paving.—The side slopes of the reservoir, inner slope of the dam, and bottom and slopes of the side channels and by-wash will be paved with stone, of sizes indicated, with or without lining of broken stone, as directed by the United States engineer. The paving will consist of stones not less than eight (8) inches nor more than twelve (12) inches in depth, laid with close joints and firmly bedded, the interstices filled with long spalls, driven tight, and the upper surface of the paving conforming accurately to the prescribed surface of the slope.

Puddling.—Should the side slopes of the reservoir require puddling at any point, selected material suitable for the purpose will be deposited in horizontal layers six (6) inches in depth, and thoroughly consolidated by ramming.

Lining.—Lining of broken stone will be placed as required by the United States engineer, and will consist of stone broken to a size not exceeding one and one-half (1½) inches in greatest dimensions; the necessary depth of lining at different parts of the work, depending on the character of the bed on which it is placed, will be indicated by the United States engineer.

Sodding and soiling.—The sods will be free from garlic and other noxious weeds, and average two (2) inches in thickness. Before the sods are laid there will be eight (8) inches of good surface soil properly graded and firmed so as to present an even surface and prevent depression in filling. After the sods are laid they will be consolidated and brought to a plane surface, either by passing a roller over them, or in case of sloping surfaces by beating with a spade or other suitable implement.

6.—The dam.

The general dimensions of the dam when completed will be, approximately, fourteen hundred and fifty-four (1,454) feet long on its upper axis, and one hundred and seventy (170) feet wide on top, with an outer slope of two (2) feet base to one (1) foot perpendicular; the top of the dam will be forty-five (45) feet above the general level of the bottom of the reservoir, and fifteen (15) feet above the flow line. With these dimensions the dam will contain in embankment about six hundred thousand (600,000) cubic yards.

Body of dam.—The body of the dam will be forty (40) feet wide on top with outer and inner slopes as hereinbefore specified. It will be composed of selected material not readily penetrated by water, such as clay and clayey gravel, built up uniformly with the puddled core described below, in layers six (6) inches thick; each layer will be carefully compacted by a heavy roller, and by driving over it in depositing the material. The distribution of the material in layers will be thoroughly done by

hand labor with such implements as may be best adapted to handling it, and all rolling and driving must be in the direction of the length of the dam; cross rolling or driving in the direction of its width will not be allowed. The excavation for the foundation bed of the body of the dam will be made to such level as, in the opinion of the United States engineer, may be required for the security of the structure.

Puddle core.—Within the body of the dam there will be constructed a puddle core of selected material, of shape and dimensions shown on plans, extending throughout the entire length of the dam and carried down to the bottom of a trench excavated as shown on plans, to a foundation in impermeable clay. The puddle core will be made by spreading the selected material (clay, sand, and gravel) in such proportions as may be required, in layers of six (6) inches depth, thoroughly incorporating the same by raking and harrowing and then rolling with a heavy grooved roller until thoroughly compacted and united with the preceding layer. Material must be selected which will not be too wet for this treatment, and if too dry it must be sufficiently moistened to effect the purpose. The object to be attained is the construction of a public wall which shall be impervious to water and shall consist of consolidated material not liable to crack from excess of clay and containing a sufficient quantity of course and fine gravel, with sand, to resist the burrowing attacks of water rats, etc.

Front embankment.—Exterior to the body of the dam the embankment will be made of any other material, excepting stumps, roots of trees, and vegetable matter, that may be obtained in the process of excavation; it will be formed without special effort at consolidation and at the convenience of the contractor, *provided* that its construction shall at no stage be in advance of the body of the dam. The contractor will hold himself at all times subject to the instructions of the United States engineer, in relation to the details of construction of the dam, whereby the whole design of the structure and the true intent of these specifications may be accomplished: these are, in general terms, to have next the water in the reservoir an ample mass of water-resisting material thoroughly compacted, and exterior thereto such material as can only be expected to act by its weight in re-enforcing the body of the dam.

7.—*Masonry.*

The masonry work will comprise that necessary for laying the iron drains in concrete and constructing head and retaining walls and conduits; the principal items will be about thirty-five hundred (3,500) cubic yards concrete; twelve (12) cubic yards cut stone; one hundred (100) cubic yards coursed rubble; ninety-five (95) lineal feet coping; two hundred and fifty (250) cubic yards brick work; and fourteen hundred (1,400) square yards of trap-rock lining for conduits, laid in cement.

Materials.—Bricks, dimension stone, and coping will be furnished by the contractor, but all other stone required under this contract will be delivered at the site of the reservoir by the United States, unless hereafter otherwise provided; stone so delivered must be sorted and broken to the required size by the contractor, without extra charge over the price bid for that part of the work in which it is to be used. All material furnished by the contractor will be carefully inspected, by an inspector appointed by the United States engineer, before it is allowed to be placed in the work, and such as is, in his opinion, not suitable for its purpose, or is not in accord with the requirements of these specifications, will be rejected and must be removed from the site of the work by the contractor without expense to the United States. The contractor must supply such laborers as may be necessary to examine and cull the material furnished by him, and if he shall neglect or refuse to do so, such laborers as, in the opinion of the United States engineer, may be necessary will be employed, and the expense thereby incurred will be deducted from, and paid out of, any money then due, or that may become due, to the contractor.

Stone, to be furnished by the contractor, must be sound, strong, and durable, not liable to injury by atmospheric changes or exposure to the action of water, and each stone must be free from seams, scales, earthy matter, or other impurities.

Brick shall be of the best quality of whole, new bricks, burned hard entirely through, free from cracks, with true smooth faces, and with a crushing strength of not less than five thousand (5,000) pounds per square inch; they must be thoroughly wet by immersion or drenching immediately before laying.

Cement used must be equal to the best brand of Cumberland cement, and must show a tensile strength of seventy-five (75) pounds per square inch after it has been mixed with water, allowed to set, and then immersed in water for twenty-four (24) hours. It must be firmly ground, freshly burned, and sufficiently slow setting to admit of working into concrete, and being put into position without loss of strength through premature setting.

Sand must be clean, sharp and angular, and absolutely free from clay or other foreign matter. The use of bank sand will not be allowed. Sand used for concrete must be coarse, and that for mortar in brick and stone masonry must be sufficiently fine to make suitable joints of the required dimensions.

Water used for mortar and concrete must be free from clay, earth, or other impurities.

Mortar, whenever used in this work, must be composed of sand and cement in the proportion of one barrel—three hundred (300) pounds—of cement and two (2) barrels of loose sand; these ingredients will be thoroughly mixed dry, and a sufficient quantity of water afterwards added to form a rather stiff paste; it will be used within one (1) hour after mixing, and not at all if once set. All mortar must be mixed and made in tight boxes provided by the contractor.

Concrete used on the work will be made as follows: One measure of cement will be thoroughly mixed dry, with two measures of sand; water will then be added to make a mortar, and four measures of broken stone will be thoroughly incorporated with the mortar. The resulting concrete must be free from surplus water, but thoroughly moistened throughout, and the voids between stones completely filled by the mortar, with mortar in excess. The broken stone used for this purpose shall be such as to measure no more than one and one-half (1½) inches in any direction, and shall be absolutely free from dust, dirt, or earthy particles. All concrete must be mixed and placed in position within the time required for the setting of the cement, in such manner that the maximum strength of the cement shall be secured in the work, otherwise it will be removed and replaced at the expense of the contractor until this object shall be attained. Concrete will be placed in uniform layers not exceeding six (6) inches in thickness, and will be carefully rammed or rolled to the satisfaction of the United States engineer.

Brick masonry must be laid in full mortar joints (on bottom, sides, and ends), which for each brick are to be formed at one operation. In no case is the joint to be made by working in the mortar after the bricks have been laid; joints will not exceed three-eighths (⅜) of an inch, and each alternate course will be laid with a line. They will be laid with such bond as may be prescribed, and the joints left smooth and carefully pointed up.

Cut-stone masonry.—Cut-stone masonry will be formed from the dimension stone furnished by the contractor; where used as *facing*, it will be laid in regular courses of alternate headers and stretchesr, and each course will have a rise of not less than ten (10) inches, with an average depth of two (2) feet; the width of each stone shall be at least one-fourth (¼) more than its rise, and the length not less than twice nor more than four times the rise; joints and beds must be truly dressed to admit of being set with one-quarter (¼) inch joints for a distance of at least twelve (12) inches back from the face of the wall, and the planes of vertical joints must be at right angles to bed and face. Where a backing to cut-stone facing is required, it will be of concrete, placed in layers of not more than six (6) inches, carried up uniformly with the facing. The *arch* through head-walls will be of cut stone throughout, conforming accurately to the dimensions, shape, and bond shown on drawings in the Engineer's Office. In laying cut stone, all joints and beds will be freed from dirt or dust, and properly moistened; each stone will be carefully set in full mortar beds and joints, laid on before the stone is placed in position.

Rubble masonry.—Where a facing of cut stone is not required, coarse rubble will be used; it will be formed of stone furnished by the United States in size and general shape suited to its purpose, but it must be selected and adapted to its place on the work by the contractor; the stone in each course will be uniform in height, laid so as to break joints by not less than four (4) inches, and to bond firmly with the backing. Each stone will be cleaned from dirt and dust before it is placed in the work, and will be laid in such full beds of mortar as are necessary to fill all void spaces; spalls may be used to fill up interior joints, but not in the face joints, which shall not exceed five-eighths (⅝) of an inch. The backing, where required, will be of concrete.

Coping.—Will be of dimension stone furnished by the contractor; it will be three (3) feet wide, not less than eight (8) inches deep, and each stone shall be at least five (5) feet long. It will be smoothly dressed to the form shown on drawings, laid in cement mortar, and joints carefully pointed with Portland cement.

Masonry conduits.—The cross-sections are shown on drawings in this office, and the conduits must be built to conform to them. They will be composed principally of concrete masonry, with lining of trap-rock and brick laid in cement, on the invert. The trap-rock will be furnished by the United States, and will be placed on the work by the contractor, as prescribed for brick masonry; the longitudinal joints on the brick and stone lining will conform accurately to the right lined elements of the cylindrical surface of the invert, and each stone or brick will be laid and bedded with unusual care. The interior surface will be left smooth and clean. The invert, or bottom curve, of the conduit and of the arch through head-walls will be built from templets, and the arch, or top curve, on true centering of ample strength, which shall not be removed until the masonry has thoroughly set; when centers are finally struck and removed it must be done with care not to crack the work. Centers in contact with concrete must be so built that the concrete will not adhere to them when they are struck and removed.

Miscellaneous.

General requirements.—The entire work must be completed on
1885. All work and workmanship must be the best of its kind, sa
respect to the United States engineer; and likewise to his satisfac
must be carried on with the utmost vigor, with ample force, and
chinery and plant, of kinds best adapted to the purpose, and requ
greatest possible progress in the prosecution of the work. The co
all necessary measures, by pumping or drainage or both, to keep th
clear of water; under no circumstances will masonry be laid in wate
in which it is to be laid or in which puddling is to be filled will be
dry before any of the material is put in place, and kept so until tha
is completed. The right is especially reserved to the United States
the employment of additional workmen and the use of additional or
when, in his opinion, this course is necessary to the accomplishme
above stated. The contractor will be responsible for the orderly be
ing force, and will be required to discharge, and keep his force fre
or insubordinate employees. Failure on the part of the contract
any of the requirements contained in this paragraph will be autho
States to annul the contract and proceed with the work in such
deemed necessary for its most speedy and economical completion
from the contractor all retained percentages and other moneys that
come due.

Payments will be made monthly on estimates prepared by inspec
by the United States engineer, and ten (10) per centum of the am
payment will be retained until the final completion and acceptance
first payment will not be made until the work shall have been carri
satisfactory to the United States engineer throughout one full ca
the estimate for that payment will include all work accepted up
said month. Subsequent payments will be made as soon after the
to which they relate as the estimates and accounts can be prepared
8th day of each month. It is to be expressly understood that pay
of the several items included in the proposal hereto attached wil
work and material required to accomplish and complete everything
specifications; no extra allowance will be made for hauling or re
terial, nor for the removal from any trench or other excavation
coming from beyond the designated limits of said trench or excav
way into the same. The contractor must assume all risks inciden
to its preservation, in all its parts, until final acceptance; he must
move all necessary coffer-dams and other auxiliary structures; do
ing; and, in general, do everything required for carrying on the w
and workmanlike manner and for securing it against damage during
completion of the work, and before final payment, the contractor m
chinery, rubbish, and refuse material from the site of the work and
taining thereto.

To prevent dispute and litigation, it is expressly stipulated that
United States engineer shall be final as to the true meaning and int
fications and on all questions of measurement made under them; an
said engineer shall have the right—

1st. To correct any errors or omissions necessary to a proper fulfill
of these specifications.

2d. To modify them whenever, in his opinion, it may be necessa
accomplishment of the object in view. Written notice of any m
each case, be furnished the contractor by the United States enginee
extra allowance, on account of such modification, will be considered
presented in writing to the said engineer by the contractor within
after receipt of the notice. The fair allowance, if any, to be made
by the United States engineer.

3d. To order such extra work as may, in his opinion, be neces
tractor is cautioned to do no such work until he shall have receiv
for the same from the United States engineer aforesaid, such orde
essential to the consideration and allowance of any claim whatever
sation; the fair compensation thereupon to be allowed will be
United States engineer.

The following *approximate* estimate of quantities will be consid
the total of each bid as a basis of award; but no variations in the
from erroneous computations, or from changes made during the pr
will be regarded as grounds for any claim against the United St
tinctly understood that the contractor is to do all that is necessary
object in view (neither more nor less), as required by the United S

Approximate estimate of quantities.

Excavation	cubic yards..	695,000
Puddling	do....	54,000
Sodding	square yards..	20,000
Cut-stone masonry	cubic yards..	12
Brick masonry	do....	250
Concrete masonry	do....	3,500
Rubble masonry	do....	100
Trap-rock lining in cement	square yards..	1,400
Broken-stone lining	cubic yards..	8,000
Paving	square yards..	80,000
Coping	lineal feet..	95
Cast-iron drains	do....	3,100

PROPOSAL.

———— ————,
————, ———— —, 1883.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

SIR: In accordance with your advertisement of August 29, 1883, inviting proposals for construction of reservoir for increasing the water supply of Washington, D. C., and subject to all the conditions and requirements thereof, and of your specifications of the same date, copies of both of which are hereto attached, and, so far as they relate to this proposal, are made a part of it, —— propose to furnish the material (except that to be furnished by the United States, as provided in the aforesaid specifications) and do the work at the following prices, viz:

Will do all excavation and dispose of the excavated material, as required, at ———— (——) cents per cubic yard.

Will do all puddling, including construction of puddle core of dam, at ———— (——) cents per cubic yard.

Will furnish sod and soil, and do all sodding, at ———— (——) cents per square yard.

Will furnish material for and lay cut-stone masonry at ———— (——) dollars and ———— (——) cents per cubic yard.

Will furnish material for and lay brick masonry, including brick lining of conduits, at ———— (——) dollars and ———— (——) cents per cubic yard.

Will furnish material (except stone) for and lay concrete masonry at ———— (——) dollars and ———— (——) cents per cubic yard.

Will furnish material (except stone) for and lay rubble masonry at ———— (——) dollars and ———— (——) cents per cubic yard.

Will lay trap-rock lining of conduits in cement at ———— (——) dollars and ———— (——) cents per square yard.

Will place broken-stone lining at ———— (——) dollars and ———— (——) cents per cubic yard.

Will do paving at ———— (——) per square yard.

Will furnish and place coping at ———— (——) dollars and ———— (——) cents per lineal foot.

Will lay iron drains at ———— (——) per lineal foot.

———— make this proposal with a full knowledge of the kind, quantity, and quality of the materials and work required, and, if it is accepted, will, after receiving written notice of such acceptance, enter into contract within ten days, with good and sufficient sureties for the faithful performance thereof, and will commence active operations within —— days after the contracts are signed.

(Signature) ———— ————,
(Address) Town of ————, county of ————, State of ————

In case of a firm, add names of partners.
(Signed in triplicate.)

BIDDER'S BOND.

Know all men by these presents, that we * ———— ————, of ————, as principal, and ———— ————, of ————, and ———— ————, of ————, as sureties, are held and bound unto the United States of America, in the penal sum of sixty thousand dollars ($60,000), to the payment of which sum, well and truly to be made, we do bind our-

selves, our heirs, executors, and administrators, jointly and severa
presents.

Given under our hands and seals this —— day of ——, 1883.

The condition of this obligation is such that, whereas, the abo
——, in response to a public advertisement and notice, dated A
given and published by Major G. J. Lydecker, Corps of Engin
Army, ha— made and presented to Major G. J. Lydecker, Corps o
States Army, a formal proposal, in writing, whereby —he— h
agreed to enter into a contract with Major G. J. Lydecker, Corps o
States Army, for construction of reservoir for increasing the wat
ington, D. C., according to the terms and conditions set forth in
and notice.

Now, therefore, if the said * —— —— shall not withdraw
within sixty days from the date of opening the proposals, and sh
from the date on which —— may be notified that —— said proposa
and the said contract awarded to —— (provide such award be
days above mentioned), duly and formally enter into such co
the terms of —— said proposal, and into such bond for its due p
be required of ——, or if —— said proposal shall not be accepte
not be awarded —— then this obligation shall be void, otherwi
either —— shall withdraw —— proposal within said sixty days, or
said ten days into such contract if awarded —— and into such bo
force, effect, and virtue.

Witnesses:

—— ——.

—— ——.

—— ——.

(Executed in triplicate.)

JUSTIFICATION OF THE SURETIES.

STATE OF ——, *County of* —— *ss:*

I, —— ——, one of the sureties named in the within bond,
pecuniarily worth the sum of —— thousand dollars ($——),
my debts and liabilities.

(Signature of surety

Before me,

(Signature of officer administering oath, with seal, if any

STATE OF ——, *County of* ——, *ss:*

I, —— ——, one of the sureties named in the within bond,
pecuniarily worth the sum of —— thousand dollars ($——)
my debts and liabilities.

(Signature of surety

Before me,

(Signature of officer administering oath, with seal, if any

CERTIFICATE.

I, —— ——, do hereby certify that —— —— and ——
above named, are personally known to me, and that, to the be
and belief, each is pecuniarily worth, over and above all his debts
sum stated in the accompanying affidavit subscribed by him.

(Signature of certifying official

NOTE.—The certificate may be given separately as to each s
accordingly.

* Insert full name of each bidder or partner.

† Fill remaining blanks with the words "he," "his," or "him
or "them," as the sense demands.

‡ Add seal of wax or wafer.

[Form 19a.]

Articles of agreement entered into October 30, 1883, *between Major G. J. Lydecker, Corps of Engineers, of the one part, and Maloney and Gleason, Washington, D. C., of the other part, for construction of reservoir for increasing the water supply of Washington, D. C.*

Articles of agreement entered into this 30th day of October, eighteen hundred and eighty-three (1883), between Major G. J. Lydecker, Corps of Engineers, U. S. Army, of the first part, and Patrick Maloney and Andrew Gleason, partners, doing business under the firm-name of Maloney and Gleason, of Washington, of the District of Columbia, of the second part:

This agreement witnesseth that, in conformity with the advertisement and specifications hereunto attached, and which form a part of this contract, the said Major G. J. Lydecker, Corps of Engineers, for and in behalf of the United States of America, and the said Maloney and Gleason, for themselves, their heirs, executors, and administrators, have mutually agreed, and by these presents do mutually covenant and agree, to and with each other, as follows:

That the said party of the second part shall furnish the material (except that to be furnished by the United States, as provided in the aforesaid specification), and do the work for *construction of reservoir* for increasing the water supply of Washington, D. C. In consideration of the material being furnished and work done, as provided for above, the said party of the first part shall pay to the said party of the second part as follows:

For excavation, thirty (30) cents per cubic yard.
For puddling, forty (40) cents per cubic yard.
For sodding, twenty (20) cents per square yard.
For cut stone masonry, fifteen (15) dollars per cubic yard.
For brick masonry, nine (9) dollars per cubic yard.
For concrete masonry, five (5) dollars and fifty (50) cents per cubic yard.
For rubble masonry, six (6) dollars per cubic yard.
For trap rock lining in cement, one (1) dollar per square yard.
For broken stone lining, two (2) dollars per cubic yard.
For paving, twenty-eight (28) cents per square yard.
For coping, five (5) dollars per lineal foot.
For cast-iron drains, seventy-five (75) cents per lineal foot.

All materials furnished and work done under this contract shall, before being accepted, be subject to a rigid inspection by an inspector appointed on the part of the Government, and such as does not conform to the specifications set forth in this contract shall be rejected. The decision of the engineer officer in charge as to quality and quantity shall be final.

The said Maloney and Gleason shall commence the work on or before the eight (8th) day of November, eighteen hundred and eighty-three (1883), and shall complete the same on or before the thirtieth (30th) day of June, eighteen hundred and eighty-five (1885).

If, in any event, the party of the second part shall delay or fail to commence with the delivery of the material or the performance of the work on the day specified herein, or shall, in the judgment of the engineer in charge, fail to prosecute faithfully and diligently the work in accordance with the specifications and requirements of this contract, then, in either case, the party of the first part, or his successor legally appointed, shall have power, with the sanction of the Chief of Engineers, to annul this contract by giving notice in writing to that effect to the party (or parties, or either of them) of the second part; and, upon the giving of such notice, all money or reserved percentage due or to become due to the party or parties of the second part by reason of this contract shall be and become forfeited to the United States; and the party of the first part shall be thereupon authorized, if an immediate performance of the work or delivery of the materials be in his opinion required by the public exigency, to proceed to provide for the same by open purchase or contract, as prescribed in section 3709 of the Revised Statutes of the United States: *Provided, however,* That if the party (or parties) of the second part shall by freshets, ice, or other force or violence of the elements, and by no fault of his or their own, be prevented either from commencing or completing the work, or delivering the materials at the time agreed upon in this contract, such additional time may, in writing, be allowed him or them for such commencement or completion as, in the judgment of the party of the first part, or his successor, shall be just and reasonable; but such allowance and extension shall in no manner affect the rights or obligations of the parties under this contract, but the same shall subsist, take effect, and be enforceable precisely as if the new date for such commencement or completion had been the date originally herein agreed upon.

If, at any time during the prosecution of the work, it be found advantageous or necessary to make any change or modification in the project, and this change or mod-

ification should involve such change in the specifications as to cha whether of labor or material, as would either increase or diminish then such change or modification must be agreed upon in writin parties, the agreement setting forth fully the reasons for such clearly the quantities and prices of both material and labor thus named in the original contract, and before taking effect must Secretary of War: *Provided*, That no payments shall be made unle or modified agreement was signed and approved before the obl such modification was incurred.

No claim whatever shall at any time be made upon the United or parties of the second part for or on account of any extra w formed or furnished, or alleged to have been performed or fu virtue of this contract, and not expressly bargained for and therein, unless such extra work or materials shall have been writing by the party of the first part or his successor, the pr thereof having been first agreed upon by the contracting parti the Chief of Engineers.

The party of the second part shall be responsible for and pay al in the prosecution of the work for labor and material.

Payments shall be made to the said Maloney and Gleason as specifications hereto attached.

Neither this contract or any interest therein shall be transfe loney and Gleason to any other party; and any such transfer sh ment of the contract so far as the United States are concerned. however, to recover for any breach of this contract by the said are reserved to the United States.

No member of or delegate to Congress, nor any person belong in, the military service of the United States, is or shall be adm part of this contract, or to any benefit which may arise herefro

This contract shall be subject to approval of the Chief of Engi

In witness whereof the undersigned have hereunto placed t the date first hereinbefore written.

G. J. LYDECKE
Major of
MALONEY & G

Witnesses:
SIMON NEWTON.
JOHN E. HERRELL.

Executed in quintuplicate.
Approved November 5, 1883.

H
Chief of Engineers, Brig.

† I do solemnly swear that the foregoing is an exact copy of a personally with —— ——; that I made the same fairly, wi advantage to myself, or allowing any such benefit or advant said —— —— or any other person; and that the papers acco those relating to the said contract as required by the statute in provided.

Subscribed and sworn to before me this —— day of —— —

NOTE.—The copy of contract for the Bureau must be accompanied with and copy of each bid and advertisement, unless previously furnished.—*See* 1879, par. XII, p. 3.

[Committee No. 71.]

Supplemental articles of agreement entered into between Maj. G. J Engineers, U. S. A., and Maloney & Gleason, of Washington, D of reservoir for increasing the water supply of Washington, D. C

Supplemental articles of agreement entered into this 20th day of dred and eighty-seven (1887), between Major G. J. Lydecker, C

* NOTE.—Here add to any contract made with an incorporated company following words, viz: "But this stipulation, so far as it relates to member gress, is not to be construed to extend to this contract."—*See* sec. 3740, Revi

† NOTE.—This affidavit is required only on the quintuplicate copy of cont turns office, Department of the Interior.

S. Army, of the first part, and Patrick Maloney and Andrew Gleason, partners, doing business under the firm name of Maloney & Gleason, of Washington, of the District of Columbia, of the second part.

Whereas on the 30th day of October, 1883, the parties above named entered into a contract for the construction of a reservoir for increasing the water supply of Washington, D. C., whereby it was provided that the work should be completed by or before the 30th day of June, 1885;

And whereas the time for completing the aforesaid work has, by successive extensions, been prolonged to June 30th, 1887, at which date the same was still unfinished, and the parties of the second part had made application for additional time in which to complete the work aforesaid;

Therefore this agreement witnesseth, that the said Major G. J. Lydecker, Corps of Engineers, for and in behalf of the United States of America, and the said Maloney & Gleason, for themselves, their heirs, executors, and administrators, have mutually agreed, and by these presents do mutually covenant and agree to and with each other as follows:

That in consideration of a further extension of time, whereby the party of the second part may be allowed the additional period of four (4) calendar months (viz, from June 30th, 1887, to October 31st, 1887) within which to complete so much of the work on the reservoir aforesaid as shall be required of said party of the second part by the party of the first part, the party of the second part shall forfeit to the United States the sum of three hundred dollars ($300.00) per month, during each month of such period of extension, in order to make good, in part, the additional cost of supervision and inspection to which the United States will be subjected by reason of such extension; and the said sum of $300.00 shall be deducted monthly from the amounts found due to the parties of the second part, for each calendar month, or part thereof, during which operations under the original contract hereinbefore referred to, dated Oct. 30th, 1883, and under these supplemental articles of agreement, shall be continued.

It is further understood and agreed, that all provisions of the original contract aforesaid, not inconsistent with these supplemental articles of agreement, shall remain of full force and effect, and that nothing herein contained, or implied, shall bind the United States to allowing the parties of the second part any additional time in which to complete all the work required of them under the said original contract.

In witness whereof the undersigned have hereunto placed their hands and seals, the date first hereinbefore written.

G. J. LYDECKER, [SEAL.]
Maj. Eng'rs, U. S. A.
MALONEY & GLEASON. [SEAL.]

Witnesses:
SIMON NEWTON.
As to M. & G.,
JNO. C. FAY.
JOHN P. SHEPPERD.

[Committee No. 72.]

Major Lydecker transmits abstracts and bids for dam construction.

OFFICE OF WASHINGTON AQUEDUCT,
Washington, D. C., October 13, 1883.

Brig. General H. G. WRIGHT,
Chief of Engineers, U. S. A., Washington, D. C.:

GENERAL: I have the honor to transmit herewith abstract of bids for dam construction for increasing the water supply of Washington, D. C., received and opened October 5, 1883, together with one copy of each proposal offered.

The lowest bids are predicated on using the Seneca stone from the Government quarry, the quality of which is satisfactory.

The lowest bidder is J. H. Dewees and Co., but I recommend the rejection of this bid for substantially the same reasons as those set forth in my recommendation relating to the award of contract for tunnel construction.

The next lowest bidder is Chittenden Brothers, and being satisfied of their responsibility and their ability to perform the work, I recommend that the contract for construction of dam be awarded to them, with the understanding that if the Government quarry does not furnish stone of suitable size and quality for coping, the latter will be of granite as per their bid for that class of stone.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[First indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
October 18, '83.

Respectfully submitted to the Hon. the Secretary of War.

The bids are predicated upon furnishing Seneca stone.

The bid of J. H. Dewees & Co. is the lowest, but is informal in this, that the names of the principals are not contained in the bond in connection with the sureties; that the sureties have given no affidavit as to their responsibility, and that the certificate as to their responsibility is not signed by an officer of the United States as contemplated by regulations. I therefore concur in Major Lydecker's recommendation that it be rejected and that the award of the contract be made to Messrs. Chittenden Bros., the next lowest bidders, who have furnished satisfactory evidence of their responsibility, and if it meet with your approval, action will be taken by me accordingly.

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

[2d indorsement.]

Approved as recommended by Major Lydecker and the Chief of Engineers.

ROBERT T. LINCOLN,
Secretary of War.

WAR DEPT., *Oct.* 20, '83.

[Committee No. 73.]

Abstract of proposals received and opened October 5, 1883, for construction of dam for increasing the water supply of Washington, D. C.

No.	Name.	Residence.	Coping masonry, 1,125 cu. yds.	Cut stone masonry, 1,550 cu. yds.	Concrete masonry, 2,000 cu. yds.	Stone filling in cribs, 475 cords.	Riprap backing, 475 cords.	Clay and gravel backing, 1,000 cu. yds.	Pine timber and plank, 175,000 ft., B. M.	Oak timber, 33,000 ft., B. M.	Wrought-iron bolts and cramps, 50,000 lbs.	Spikes and nails, 2,500 lbs.	Excavation, 1,800 cu. yds.	Area to be cleared, 8,000 sq. yds.	Aggregate cost of items in approximate bill	Remarks.
											Cts.	*Cts.*				Dam complete using—
1	J. H. Dewees and Co	Washington, D. C	$39.55	$31.00	$4.75	$12.00	$10.00	$0.75	$39.00	$49.00	7½	4½	$2.00	$0.15	$130,054.50	Cape Ann and Berea Stone Co.
			40.50	10.00	4.75	3.00	3.00	"	"	"	"	"	"	"	91,198.25	Seneca stone, Government quarry.
2	Crittenden Brothers	Washington, D. C	32.00	25.75	5.50	6.50	7.25	1.00	45.00	75.00	7	6	1.00	.05	110,481.25	Leete's Island Granite Quarries.
			24.50	20.75	5.50	6.50	7.25	"	"	"	"	"	"	"	94,293.75	Seneca stone, Government quarry.
3	Stephens, Gere and Co	Syracuse, N. Y	30.00	16.00	6.00	12.50	12.00	1.00	45.00	55.00	10	10	1.50	.75	106,515.00	Seneca quarry above the Falls.
			29.75	15.75	6.00	2.50	2.50	"	"	"	"	"	"	"	96,833.75	Seneca stone, Government quarry.
4	Henry L. Cranford	Washington, D. C	45.00	39.00	6.00	9.00	9.00	1.50	40.00	50.00	5	6	1.00	.10	146,800.00	Millstone Point.
			40.00	34.00	6.00	9.00	9.00	"	"	"	"	"	"	"	133,425.00	Seneca stone, Government quarry.
5	Charles Hart	Brooklyn, N. Y	40.00	35.00	6.00	18.00	12.00	3.00	160.00	160.00	10	6	.30	.10	167,820.00	State of Maine Quarries.
			30.00	24.00	6.00	18.00	12.00	"	"	"	"	"	"	"	139,520.00	Seneca stone, Government quarry.
6	John Beattie	Leete's Island, Conn	34.75	28.40	10.50	8.60	8.10	2.25	94.50	98.50	16	10	.95	.20	145,429.25	Granite quarries in Leete's Island, Conn.
7	Humbird and Morgan	Cumberland, Md	50.00	48.00	6.00	12.00	15.00	2.00	150.00	150.00	4	4	1.00	.50	196,275.00	Mount Waldo Granite.
8	Hoope's Artificial Stone Co	Baltimore, Md	14.00	.....	.....	4.00	4.00	3.00	60.00	60.00	5	5	.99	.06	.....	"Hoope's Beton Coignet."

Respectfully submitted.

G. J. LYDECKER,
Major of Engineers, U. S. A.

OFFICE WASHINGTON AQUEDUCT,
Washington, D. C., October 13, 1883.

[Committee No. 74.]

Advertisement, instructions, specifications, proposals, and bidder's bond for construction of dam for increasing the water supply of Washington, D. C.

[Advertisement.]

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., August 29, 1883.

Sealed proposals, in triplicate, for the work required for increasing the water supply of the city of Washington, in accordance with the act of Congress approved July 15th, 1882, will be received at this office until 12 o'clock noon, on Friday, October 5th, 1883, when they will be publicly opened; the work to be done comprises three different classes, viz:

Class A.—Dam construction.—This consists (1st) of raising the present masonry dam across the Maryland channel of the Potomac River at the Great Falls by a coping 15 inches thick; (2d) the extension of the dam across Conn's Island by a masonry structure about 1,120 feet long with an average height of about 6 feet; and (3d) the further extension of the dam about 450 feet across the Virginia channel by a substructure of crib work filled with stone, and a superstructure of masonry, together with about 300 feet of masonry dam to make connection with the Virginia shore.

* * * * * * *

Separate proposals, in triplicate, must be made for each class. Parties proposing to bid will apply at this office for blanks for proposals, specifications, and all information, being careful to state for which class or classes of work blanks are desired; but they will be furnished only to such parties as show *prima facie* evidence that they are able, financially and by experience, to undertake the work on which they propose to bid.

Each bidder must submit with his proposals written evidence on which he relies to establish his capacity to perform the work, reference being had to his experience on work of like character, to the plant at his disposal and which he proposes to use, and to his financial ability to do all that is necessary for a rapid prosecution of the work. Before proposals are opened each bidder must certify to the undersigned that either personally or by a duly authorized agent he has inspected the natural features of the locality in which the work is located and examined the drawings on file in this office.

The right is reserved to reject any and all bids or parts of bids.

G. J. LYDECKER,
Major of Engineers, U. S. A.

General instructions for bidders.

1. All proposals must be in triplicate, on the accompanying form. They must be inclosed in a sealed envelope, and endorsed "Proposals for Construction of Dam." This parcel should then be placed inside a second envelope, and be addressed to *Office of the Washington Aqueduct, Georgetown Station, Washington, D. C.* No responsibility shall attach to the officer in charge for the premature opening of any proposal not endorsed as above directed.

2. The bidder's bond—executed in triplicate—must be signed by two (2) responsible sureties in the sum of twenty thousand dollars ($20,000), to be certified to as good and sufficient sureties by a United States district attorney, collector of customs, or any other officer under the United States Government, or responsible person known to this office.

3. A firm will not be accepted as a surety, nor will a partner be accepted as surety for a copartner or for a firm of which he is a member.

4. An officer of a corporation will not be accepted as surety for such corporation.

5. Where firms bid, the individual names of the members should be written out, and should be signed in full, giving the Christian names; but the signers may, if they choose, describe themselves in addition as doing business under a given name and style as a firm.

6. Signature of obligor and sureties to bidder's bond must have affixed to them seals of wax or wafer.

7. The place of residence of every bidder, with county and State, must be given after his signature, which must be written in full.

8. Any one signing a proposal as the agent of another, or of others, must file with it legal evidence of his authority so to do.

9. Alterations by erasures or interlineations should be explained or noted in the proposal over the signature of the bidder.

10. If a bidder wishes to withdraw his proposal, he may do so before the time fixed for the opening, without prejudice to himself, by communicating his purpose in writ-

ing to the officer who holds it, and when his proposal is reached, it will be handed to him, or his authorized agent, unread.

11. All prices must be written as well as expressed in figures.

12. The contract which the bidder promises to enter into shall be in the form adopted and in use by the Engineer Department of the Army, blank forms of which can be inspected at this office. Parties making bids are to be understood as accepting the terms and conditions contained in such form of contract.

13. Reasonable grounds for supposing that any bidder is interested in more than one bid for the same item will cause the rejection of all bids in which he is interested.

14. The United States reserves the right to reject any and all bids; also to disregard the bid of any *failing bidder or contractor*, known as such to the Engineer Department.

15. The bidder must satisfy the United States engineer in charge of his ability to furnish the materials or perform the work for which he bids. The character of the machinery to be used and the capacity and standing of the bidder will be considered in making the award.

16. Transfers of contracts or of interests in contracts are prohibited by law.

17. Bidders are invited to be present at the opening of the bids.

SPECIFICATIONS.

The work to be done consists in completing the present dam at the Great Falls of the Potomac River to a level of one hundred and forty-eight (148) feet above tide, and extending the same to the Virginia shore. The completion of the present dam is to be accomplished by placing a stone coping fifteen (15) inches thick and about one thousand and sixty (1,060) feet long; the extension involves the construction of a masonry dam across Conn's Island to deep water in the Virginia channel, and from the opposite side of said channel to the Virginia shore, and of a crib-dam with a masonry superstructure across the deep water of the Virginia channel. The masonry dam in this extension will have an aggregate length of about fourteen hundred and sixty (1,460) feet, and an average height of about six (6) feet; the crib-dam will be about four hundred and fifty (450) feet long, placed in water whose average depth is about twelve (12) feet and greatest depth nineteen (19) feet at ordinary low-water stages.

Unless hereafter otherwise directed the order of work will be: first, the construction of the masonry dam to such height as may be directed by the U. S. engineer; second, the construction of the crib-dam across the deep water of the Virginia channel with its superstruction and coping complete; third, the completion of the masonry dam, and finally the coping of the present dam.

A.—Masonry dam.

Clearing and excavating.—The work will be commenced by clearing the ground across Conn's Island of all trees, drift, &c., along the line of the dam for a width of one hundred (100) feet, and removing the same, together with refuse of every kind, from this area in such manner as to prevent any interference with the future progress of the work. The material overlaying bed-rock will then be removed for such width as is required for the foundation of the dam and deposited in spoil banks, as directed by the United States engineer; stumps, logs, and refuse encountered in this excavation will be removed from the cleared area, as heretofore provided; earth and stone will be placed in separate spoil banks. The width of excavation for the above purpose will be about fourteen (14) feet at bottom, with side slopes of 1 base to 1 vertical, and its average depth probably eight (8) feet. Bed-rock having been uncovered the foundation bed for the dam will be prepared by removing all loose or disintegrated rock, and finished in offsets, or in such other manner as, in the opinion of the United States engineer, may be necessary to obtain a proper bed for the dam. The foundation bed for that portion of the masonry dam included between Conn's Island and the Virginia shore must be prepared for receiving the dam in the manner heretofore described. Seams and fissures in the bed-rock, within the limits of the foundation bed, must be cleaned out and filled with cement mortar, or concrete, as the case may require; all the cost for preparing the bed as required above will be included in the price paid for masonry. During the process of preparing the foundation bed and laying the masonry of the dam the area of the bed must be kept clear of water by sufficient embankments, coffer-dams, and pumps. In constructing the masonry of the dam the contractor will not be allowed to work under water.

Masonry.—The dam will be eight (8) feet wide at top, with a vertical face down-stream, the up-stream face having a slope of ¼ or two (2) vertical to one (1) horizontal. The down-stream facing, and the up-stream facing for a depth of two (2) courses below the coping, will be laid in regular courses not less than twelve (12) inches in

thickness. The stone will be not less than four (4) feet long and three (3) feet wide; they will be dressed to give mortar joints of not more than three-eighths (⅜) of an inch, beds horizontal, and vertical joints perpendicular to beds and face; they will be quarry faced, with a draft of one (1) inch along the face edges. The rise of each course—both on the up and down stream sides—will be uniform throughout, and the stone will be laid alternately as header and stretcher, in each course and in contiguous courses, in such manner that headers in the up-stream face will be opposite stretchers in the down-stream face; vertical joints in each course to be as nearly midway between those in the course below as practicable, and in no case to approach the latter closer than eight (8) inches. Each stone must be properly dressed to fit in its place before it is raised on the dam, and it must be raised and lowered directly into position by suitable machinery; moving stone about on the dam will not be allowed.

Before any stone is placed all beds and joints must be carefully cleansed of dust, and of all adhering particles of foreign matter; beds and joints properly moistened, and each stone laid in full mortar evenly spread over bed and joint.

The body of dam will be of concrete, placed in layers six (6) inches thick, and carefully rammed; it will follow close after the placing of the facing, but not until the mortar in the joints has set. The facing of the top courses will be secured by iron bolts and cramps, as indicated on drawings.

The coping of the dam will be eight (8) feet and three (3) inches wide, of uniform thickness not less than twelve (12) inches, and the minimum length of stone, in the direction of the axis of the dam, will be such that its cubic contents shall be not less than forty (40) cubic feet; but in no case shall this length be less than four (4) feet. In all other respects the coping will be as hereinafter described for the coping of the present dam.

B.—Dam across the Virginia channel.

General requirements.—The crib-work of this structure will be made up of separate cribs, the object being to put in place a crib substructure whose upper surface shall be level at an elevation of one hundred and forty-five (145) feet above tide, or three (3) feet below the crest of the masonry superstructure. To this end the contractor will be required to remove loose rock and boulders along the line of the dam, and build the bottom of his crib-work to conform with the irregularities of the river bed, so that when the crib is sunk in position its upper surface will be level at the elevation hereinbefore mentioned; but no allowance beyond the amount paid for material in the dam will be made for any of this work. Each crib will be built to its full height before being taken to its position and sunk; it will be sunk into place by loading stone on the top until the crib is brought solidly to its bearing on the bottom; if it should then be found that the crib is out of line or level, it will be lightered and floated again, if necessary to correct the trouble, and this operation will be repeated as often as may be found necessary to accomplish the object in view. Each crib must be closely in contact with that next to it, must be level, in accurate line, and solidly filled with stone before it will be accepted.

In general, where the river-bed is below the elevation of one hundred and thirty-six (136) feet, the crib will be built in length of thirty (30) feet, twenty-four (24) feet wide up to an elevation of one hundred and forty (140) feet above tide, and thence sixteen (16) feet wide to the elevation of one hundred and forty-five (145) feet aforesaid; the deepest central crib will be placed first. Where the elevation of the river-bed is at, or above, one hundred and thirty-six (136) feet the cribs will be sixteen (16) feet in width, and of such lengths, not less than thirty (30) feet, as may be directed by the United States engineer. The drawings in this office show approximately the lengths and widths of the cribs of which the dam is to be composed.

Crib-work.—The cribs must be constructed in exact accordance with the detailed drawings furnished by the U. S. engineer, or as he may direct with reference to any point not clearly shown thereby, or by these specifications. All cross-ties will be single sticks, in length equal to the width of crib; wall sticks will be in single lengths for cribs thirty (30) feet or less in length; for longer cribs they will be in lengths of not less than sixteen (16) feet, and so distributed as to break joints in contiguous courses by at least two (2) feet, and so that the joints will not come within two (2) feet of any gain or dovetail, except where the distance between gains is less than four (4) feet, in which case the intermediate joint will be equidistant from the gain on each side of it. When butt joints are made by wall sticks in the same crib, a block twenty (20) inches long will be placed under the joint, in the space below the abutting timbers, and secured by drift-bolts thirty (30) inches long passing through the said timbers, the block, and into the timber course below. Dovetail joints must be carefully framed, so that the tenons will fit tightly into gains, shoulders of ties bear solidly against crib walls, and ends of ties be flush with the outer face of cribs, excepting where they are required to be prolonged beyond. The system of bolting, shown on drawings, must be strictly adhered to: drift-bolts of one (1) inch round

iron must be driven through holes bored for the full length of the bolts with an auger fifteen-sixteenths ($\frac{15}{16}$) of an inch in diameter. After all the cribs are in position the up-stream face will be double sheathed with plank placed vertically; the interior sheathing will be one (1) inch thick, and the outer sheathing two (2) inches thick, so placed as to cover the inner joints by at least four (4) inches; the lower ends of outer sheathing will be beveled, and each plank will be solidly driven down on the river-bed before it is spiked in position; each of the interior sheathing plank will be secured to top course of crib by two (2) ten-penny cut nails, and each outer plank by two (2) eight (8) inch cut spikes.

Superstructure.—After the sheathing is secured the masonry superstructure must be placed as rapidly as possible, and all the stone for this purpose must have been cut and prepared for its place in the work by the time the sheathing of the dam is commenced. The superstructure will rest on a platform, composed of three (3) inch and four (4) inch plank, built as shown on drawings; this platform will be secured to the top of the crib substructure by not less than two (2) six (6) inch spikes in each plank at its crossings with each tie, and it must be truly level throughout. Before placing this platform the underlying stone filling of crib must be carefully leveled by hand and packed in with small stone so as to make this filling flush with the tops of ties. The masonry will consist—1st, of a bed of hydraulic cement mortar leveled at one (1) inch above the four (4) inch plank in the platform; 2d, a masonry course comprising an up and down stream face of cut stone with a continuous concrete filling between faces; the stone for facing will be not less than three (3) feet wide and four (4) feet long, all laid as stretchers in a bed of fresh hydraulic mortar one-half ($\frac{1}{2}$) inch thick, placed on the general mortar bed; the concrete filling will be thoroughly rammed in courses not more than six (6) inches thick, and be brought to the level of the stone facing; after the concrete is placed the stone of opposite facings will be tied together by iron cramps as shown in drawings. The thickness of this course will be uniform, and such that its top will be at the proper level for receiving the coping course; 3d, a coping course which will be in all respects like that of the masonry dam heretofore described. None of this masonry will be built in water, and to aid in this work the sheathing of cribs may be left projecting above the water surface until the lower course of masonry has been laid, if the stage of water in the river admits of so doing; the sheathing will be then sawed off to the level of the top of this course, and a temporary stop plank used to divert the water as the coping course is laid and while the mortar in joints and bed of that course is setting, but no payment will be made to the contractor for the sheathing left projecting above the top course of the crib-work. If the stage of water makes the above method impracticable the contractor will be required to use such coffer work as will accomplish the desired object. An apron of oak timbers, six (6) inches by six (6) inches, built as shown on drawings, will complete the superstructure of the dam; the capping timbers to which these pieces are secured will also be of oak; the apron timbers will be secured by wrought iron boat spikes, twelve (12) inches long and one-half ($\frac{1}{2}$) inch square, holes seven-sixteenths ($\frac{7}{16}$) of an inch in diameter, having been bored through the six (6) inch by six (6) inch timbers before placing the spikes, which must be driven so that their heads are below the surface of timbers. The stone filling under this apron will be carefully placed by hand so as to be solid up to its lower surface before the timbers are placed.

The dam must connect water tight at its ends with the adjacent masonry dam, and to aid in this purpose the extreme ends of the outer cribs will be built solid and filled with concrete, in lieu of stone, placed by suitable buckets with trap bottoms, or through chutes, in such manner as not to impair the quality of the concrete mass; suitable provisions will then be made for excluding the water from the space included between this mass and the adjacent masonry dam or natural rock in place, as the case may be, and this space will then be carefully filled with concrete in such manner as to make water-tight connection satisfactory to the United States engineer.

C.—Coping for present dam.

This dam is a masonry structure one thousand and sixty (1,060) feet long, and the work to be done consists in placing a stone coping eight (8) feet and three (3) inches wide and fifteen (15) inches thick, laid in hydraulic cement, and secured by iron bolts and cramps.

Each stone will be eight (8) feet three (3) inches long, fifteen (15) inches thick, and not less than four (4) feet wide; they will be laid entirely as through headers, each stone covering the entire width of dam and projecting three (3) inches beyond its down-stream face.

The stone will be truly squared and dressed to the shape shown by drawings; the cutting of beds and joints will be such as to admit of laying with one-quarter ($\frac{1}{4}$) inch mortar joints; the upper surface and edge rough-pointed, and the down-stream surface quarry-faced, with a chisel draught one (1) inch wide along the edges; top

and bottom surfaces parallel, and vertical joints perpendicular to faces and beds. All cutting and dressing must be completed before the stone is brought to its place on the work, and it must be put in place by suitable machinery, without being moved about on the dam.

Before any stone is placed in position the top surface of the present dam must be cleared of all loose stone, loose or disintegrated mortar and dirt, and properly leveled, so as to afford a firm and solid bed; when the stone is laid, its bed and joints and the top surface of the dam must be carefully cleaned and moistened, and it must be lowered directly to its place in a full bed of hydraulic mortar one-quarter (¼) inch thick spread uniformly over bed and joint. Each stone must be secured to the body of the dam and to each other by bolts and cramps, as shown by drawings; bolts and cramps will be secured by a cement of lead and antimony, in the proportion of eigthy-five (85) parts of lead to fifteen (15) of antimony. Until the work of placing this coping is commenced the contractor will be authorized to use the present dam as a road-bed for railway to transport material to be used on other parts of the work.

Material.

All material used in any of the foregoing work must be of best quality of its kind and satisfy the following conditions; it will all be carefully inspected before being placed in the work, under the directions of the United States engineer, and such as is not satisfactory must be removed from the site of the work by the contractor. The contractor will be required to furnish all labor necessary to handle material and to aid the inspector in his inspections.

Timber and plank.—Must be straight and sound, sawed accurately to required dimensions, free from excessive wane, shake, splits, rot, black or decayed knots or other imperfections, by which its strength and durability may be impaired.

Stone.—Must be of sound and durable character, such as shall be approved by the United States engineer, and must be free from splits or any defects tending to impair its strength and durability. No stone liable to disintegration under water will be taken, nor will stone quarried during the winter or at a time when it is liable to be affected by frost be accepted. *The locality of the quarry from which it is proposed to obtain the stone must be distinctly stated by the bidder in his proposal* The least dimension of stone used for curb filling must be not less than ten (10) inches; boulders and other stone found in the vicinity will probably supply what is needed for this purpose; but all light, flat, or shaly stone will be rejected. Rip-rap stone, not confined in the cribs, must be of similar character, but larger in size, each being, in general, such as to require two (2) men to handle it. All stone to be used for rip-rap or crib filling must be carefully piled in some position convenient to the work, so that it may be accurately measured by the inspector before it is used in the work. The right is reserved by the United States to furnish to the contractor the *coping stone* required for the work, if, in the opinion of the United States engineer, such course is advisable; in this case the stone will be delivered to the contractor on the banks of the Chesapeake and Ohio Canal adjoining the work; it will be hauled therefrom by the contractor who is to place it, and will be dressed by the United States in readiness to be placed in the work.

Iron—For bolts and cramps will be of best quality American wrought-iron, free from all defects; drift bolts for crib-work will be of one (1) inch round iron, slightly pointed and swedged, or headed to a diameter of not less than one and one-quarter (1¼) inches.

Cement.—The cement used must be equal to the best brand of Cumberland cement, and must show a tensile strength of seventy-five (75) pounds per square inch after it has been mixed with water, allowed to set, and then immersed in water for twenty-four (24) hours. It must be firmly ground, freshly burned, and sufficiently slow setting to admit of working into concrete, and being put into position without loss of strength through premature setting.

Sand.—All sand must be clear, sharp, and angular, and absolutely free from clay or other foreign matter. The use of bank sand will not be allowed. Sand used for concrete must be coarse, and that for mortar in brick and stone masonry must be sufficiently fine to make suitable joints of the required dimensions.

Water.—The water used for mortar and concrete must be free from clay, earth, or other impurities.

Mortar.—Mortar, whenever used in this work, must be composed of sand and cement in the proportion of one (1) barrel—three hundred (300) pounds—of cement and two (2) barrels of loose sand; these ingredients will be thoroughly mixed dry, and a sufficient quantity of water afterwards added to form a rather stiff paste; it will be used within one (1) hour after mixing, and not at all if once set. All mortar must be mixed and made in tight boxes provided by the contractor.

Concrete.—All concrete used on the work will be made as follows: One measure of cement will be thoroughly mixed dry, with two measures of sand; water will then

be added to make a mortar, and four measures of broken stone will be thoroughly incorporated with the mortar. The resulting concrete must be free from surplus water, but thoroughly moistened throughout, and the voids between stones completely filled by the mortar, with mortar in excess. The broken stone used for this purpose shall be such as to measure no more than one and one-half (1½) inches in any direction, and shall be absolutely free from dust, dirt, or earthy particles. All concrete must be mixed and placed in position within the time required for the setting of the cement, in such manner that the maximum strength of the cement shall be secured in the work, otherwise it will be removed and replaced at the expense of the contractor until this object shall be attained. Concrete will be placed in uniform layers not exceeding six (6) inches in thickness, and will be carefully rammed or rolled to the satisfaction of the U. S. engineer.

Miscellaneous.

General requirements.—The entire work must be completed on or before June 30, 1885. All work and workmanship must be the best of its kind, satisfactory in every respect to the United States engineer; and likewise to his satisfaction all operations must be carried on with the utmost vigor, with ample force, and all necessary machinery and plant, of kinds best adapted to the purpose, and required to insure the greatest possible progress in the prosecution of the work. The right is especially reserved to the United States engineer to direct the employment of additional workmen and the use of additional or better machinery when, in his opinion, this course is necessary to the accomplishment of the purposes above stated. The contractor will be responsible for the orderly behavior of his working force, and will be required to discharge, and keep his force free of, all disorderly or insubordinate employees. Failure on the part of the contractor to comply with any of the requirements contained in this paragraph will be authority for the United States to annul the contract and proceed with the work in such manner as may be deemed necessary for its most speedy and economical completion, and to withhold from the contractor all retained percentages and other moneys that may be due or become due.

Payments will be made monthly on estimates prepared by inspectors and approved by the United States engineer, and ten (10) per centum of the amount due on each payment will be retained until the final completion and acceptance of the work. The first payment will not be made until the work shall have been carried on in a manner satisfactory to the United States engineer throughout one full calendar month, and the estimate for that payment will include all work accepted up to the last day of said month. Subsequent payments will be made as soon after the close of the month to which they relate as the estimates and accounts can be prepared, generally by the 8th day of each month.

It is to be expressly understood that payments on account of the several items included in the proposal hereto attached will be in full for all work and material required to accomplish and complete everything required by these specifications.

The contractor must assume all risks incident to the work and to its preservation, in all its parts, until final acceptance; he must construct and remove all necessary coffer dams and other auxiliary structures; do all required pumping; remove ice, snow, and drift that may accumulate during the progress of the work, and in general do everything required for carrying on the work in a vigorous and workmanlike manner and for securing it against damage, by freshets or otherwise, during its progress.

On completion of the work and before final payment the contractor must remove all machinery, rubbish, and refuse material from the site of the work and from the land pertaining thereto.

To prevent dispute and litigation it is expressly stipulated that the decision of the United States engineer shall be final as to the true meaning and intent of these specifications and on all questions of measurement made under them; and further, that the said engineer shall have the right—

1st. To correct any errors or omissions necessary to a proper fulfillment of the intent of these specifications.

2d. To modify them whenever, in his opinion, it may be necessary for the proper accomplishment of the object in view. Written notice of any modification will, in each case, be furnished the contractor by the United States engineer, and no claim for extra allowance on account of such modification will be considered or allowed unless presented in writing to the said engineer by the contractor within forty-eight hours after receipt of the notice. The fair allowance, if any, to be made will be determined by the United States engineer.

3d. To order such extra work as may, in his opinion, be necessary, but the contractor is cautioned to do no such work until he shall have received a written order for the same from the United States engineer aforesaid, such order being absolutely essential to the consideration and allowance of any claim whatever for extra compen-

sation; the fair compensation thereupon to be allowed will be determined by the United States engineer.

The following *approximate* estimate of quantities will be considered in computing the total of each bid as a basis of award; but no variations in these amounts arising from erroneous computations, or from changes made during the progress of the work, will be regarded as grounds for any claim against the United States, it being distinctly understood that the contractor is to do all that is necessary to accomplish the object in view (neither more nor less) as required by the United States engineer.

Approximate estimate of quantities.

Coping masonry	cubic yards..	1,125
Cut-stone masonry	do....	1,550
Concrete masonry	do....	2,000
Stone filling in cribs	cords..	450
Riprap backing	do....	475
Clay and gravel backing	cubic yards..	1,000
Pine timber and plank	feet, B. M..	175,000
Oak timber	do....	33,000
Wrought-iron bolts and cramps	pounds..	50,000
Spikes and nails	do....	2,500
Excavations	cubic yards..	1,800
Area to be cleared	square yards..	8,000

Under the foregoing "advertisement, instructions, specifications, proposals, and bidder's bond" the following proposals were received:

PROPOSAL OF J. H. DEWEES & CO.

WASHINGTON, D. C., *Oct. 5th*, 1883.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

SIR: In accordance with your advertisement of August 29, 1883, inviting proposals for construction of dam for increasing the water supply of Washington, D. C., and subject to all the conditions and requirements thereof, and of your specifications of the same date, copies of both of which are hereto attached, and, so far as they relate to this proposal, are made a part of it, we propose to furnish the materials and do the work at the following prices, viz:

Will furnish material for and place stone coping at thirty-nine ($39) dollars and fifty-five (55) cents per cubic yard.

If coping is furnished and dressed by the United States, will furnish the mortar, set, and secure the stone in the work for ten ($10) dollars per cubic yard.

Will furnish material for and place cut-stone masonry at thirty-one ($31) dollars per cubic yard.

Will furnish material for and place concrete masonry at four ($4) dollars and seventy-five (75c.) cents per cubic yard.

Will furnish stone filling, properly leveled in cribs, at twelve ($12) dollars per cord of 128 cubic feet.

Will furnish and place stone for riprap backing at ten ($10) dollars per cord of 128 cubic feet.

Will furnish and place backing of clay and gravel as required at seventy-five (75c.) cents per cubic yard.

Will furnish pine timber and plank framed and secured in the work at thirty-nine ($39) dollars per thousand feet B. M.

Will furnish oak timber framed and secured in the work at forty-nine ($49) dollars per thousand feet B. M.

Will furnish wrought-iron drift bolts and cramps secured in the work at seven and one-half (7½c.) cents per pound.

Will furnish all nails and spike in the work at four and three-fourths (4¾) cents per pound.

Will do all excavation at two dollars (2.00) cents per cubic yard.

Will clear trees, drift, and all rubbish, for a width of one hundred (100) feet, more or less, along the line of the new masonry dam for fifteen (15c.) cents per square yard of area cleared.

The stone that we propose to furnish, as above, for coping and cut-stone masonry is to be obtained from as follows: For coping, from Cape Ann; for cut-stone masonry, from Berra Stone Co.

If permitted to take stone from the Seneca quarry, claimed by the Government, we will make the prices for masonry and stone work as follows:

For coping, forty ($40) dollars and fifty (50c.) cents per cubic yard.

For cut-stone masonry, ten ($10) dollars per cubic yard.
For concrete masonry, four ($4) dollars and seventy-five (75c.) cents per cubic yard.
For stone filling, three ($3) dollars per cubic yard.
For riprap backing, three ($3) dollars per cubic yard.
We make this proposal with a full knowledge of the kind, quantity, and quality of the materials and work required, and, if it is accepted, will, after receiving written notice of such acceptance, enter into contract within ten days, with good and sufficient sureties for the faithful performance thereof, and will commence active operations within ten days after the contracts are signed.

J. H. DEWEES & CO. [SEAL.]
Town of Washington, D. C., 1701 Boundary st.

In case of a firm, add names of partners.

J. H. DEWEES. [SEAL.]
SAMUEL WALTON. [SEAL.]
REESE EVANS. [SEAL.]
H. O. BRUMMELL. [SEAL.]

(Signed in triplicate.)

Bidder's bond.

Know all men by these presents, that we, J. G. Dale, Tionester, Forest Co., Pa., as principal, and W. J. Green, of Washington, D. C., as sureties, are held and bound unto the United States of America, in the penal sum of twenty thousand dollars ($20,000), to the payment of which sum, well and truly to be made, we do bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents.

Given under our hands and seals this fifth day of Oct., 1883.

The condition of this obligation is such that, whereas the above bounden J. G. Dale and W. J. Green, in response to a public advertisement and notice, dated August 29, 1883, and given and published by Major G. J. Lydecker, Corps of Engineers, United States Army, have made and presented to Major G. J. Lydecker, Corps of Engineers, United States Army, a formal proposal, in writing, whereby they have proposed and agreed to enter into a contract with Major G. J. Lydecker, Corps of Engineers, United States Army, for construction of dam for increasing the water supply of Washington, D. C., according to the terms and conditions set forth in said advertisement and notice.

Now, therefore, if the said J. G. Dale and W. J. Green shall not withdraw their said proposal within sixty days from the date of opening the proposals, and shall within ten days from the date on which they may be notified that their said proposal has been accepted, and the said contract awarded to them (provide such award be made within the sixty days above mentioned), duly and formally enter into such contract agreeably to the terms of their said proposal, and into such bond for its due performance as shall be required of them, or if their said proposal shall not be accepted and such contract not be awarded them, then this obligation shall be void, otherwise, that is to say, if either of us shall withdraw our proposal within said sixty days, or fail to enter within said ten days into such contract if awarded, and into such bond, to remain in full force, effect, and virtue.

J. G. DALE. [SEAL.]
W. J. GREEN. [SEAL.]

Witnesses:
H. L. TODD.
MICHAEL L. WOODS.

(Executed in triplicate.)

Justification of the sureties.

STATE OF PENNA.,
County of Forest, ss:

I, J. G. Dale, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of fifty thousand dollars ($50,000) over and above all my debts and liabilities.

J. G. DALE. [SEAL.]

Before me,
(Signature of officer administering oath, with seal, if any) ——— ———.

WASHINGTON,
D. C., ss:

I, W. J. Green, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of twenty-five thousand dollars ($25,000) over and above all my debts and liabilities.

W. J. GREEN. [SEAL.]

Before me,
(Signature of officer administering oath, with seal, if any) ——— ———.

Certificate.

I, L. E. Johnson, do hereby certify that J. G. Dale and W. J. Green, the sureties above named, are personally known to me, and that, to the best of my knowledge and belief, each is pecuniarily worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

L. E. JOHNSON. [SEAL.]

[Committee No. 75.]

PROPOSAL OF CHITTENDEN BROTHERS.

WASHINGTON, D. C., *October 4th*, 1883.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

SIR: In accordance with your advertisement of August 29, 1883, inviting proposals for construction of dam for increasing the water supply of Washington, D. C., and subject to all the conditions and requirements thereof, and of your specifications of the same date, copies of both of which are hereto attached, and, so far as they relate to this proposal, are made a part of it, we propose to furnish the materials and do the work at the following prices, viz:

* Will furnish material for and place stone coping at thirty-two (32) dollars and ——— (——) cents per cubic yard.

If coping is furnished and dressed by the United States, will furnish the mortar, set and secure the stone in the work for seven (7) dollars and fifty (50) cents per cubic yard.

* Will furnish material for and place cut-stone masonry at twenty-five (25) dollars and seventy-five (75) cents per cubic yard.

Will furnish material for and place concrete masonry at five (5) dollars and fifty (50) cents per cubic yard.

Will furnish stone filling, properly leveled in cribs, at six (6) dollars and fifty (50) cents per cord of 128 cubic feet.

Will furnish and place stone for riprap backing at seven (7) dollars and twenty-five (25) cents per cord of 128 cubic feet.

Will furnish and place backing of clay and gravel as required at one (1) dollar and ——— (——) cents per cubic yard.

Will furnish pine timber and plank framed and secured in the work at forty-five (45) dollars and ——— (——) cents per thousand feet B. M.

Will furnish oak timber, framed and secured in the work at seventy-five (75) dollars and ——— (——) cents per thousand feet B. M.

Will furnish wrought-iron drift-bolts and cramps secured in the work at seven (7) cents per pound.

Will furnish all nails and spike in the work at six (6) cents per pound.

Will do all excavation at one hundred (100) cents per cubic yard.

Will clear trees, drift, and all rubbish, for a width of one hundred (100) feet, more or less, along the line of the new masonry dam for five (5) cents per square yard of area cleared.

The stone that we propose to furnish, as above, for coping and cut-stone masonry is to be obtained from Leetes' Island granite quarries, Leetes' Island, New Haven Co., Conn.

If permitted to take stone from the Seneca quarry, claimed by the Government, we will make the prices for masonry and stone work as follows:

For coping, twenty-four (24) dollars and fifty (50) cents per cubic yard.

For cut-stone masonry, twenty (20) dollars and seventy-five (75) cents per cubic yard.

For concrete masonry, five (5) dollars and fifty (50) cents per cubic yard.

For stone filling, six (——) dollars and fifty (——) cents per cubic yard.

For riprap backing, seven (7) dollars and twenty-five (25) cents per cubic yard.

We make this proposal with a full knowledge of the kind, quantity, and quality of the materials and work required, and, if it is accepted, will, after receiving written notice of such acceptance, enter into contract within ten days, with good and sufficient sureties for the faithful performance thereof, and will commence active operations within ten days after the contracts are signed.

CHITTENDEN BROTHERS,
Corcoran Building, Washington, Dist. of Columbia.

In case of a firm, add names of partners: Samuel H. Chittenden, Geo. B. Chittenden.

(Signed in triplicate.)

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* The erasures on these items were made by us; the price for coping is thirty-two (32) dollars; and for the masonry twenty-five (25) dollars and seventy-five (75) cents.

CHITTENDEN BROTHERS.

Bidder's bond.

Know all men by these presents that we, Samuel H. Crittenden and George B. Crittenden, both of Washington, D. C., as principals, and Horace S. Cummings, of Washington, D. C., and Walter Paris, of Washington, D. C., as sureties, are held and bound unto the United States of America, in the penal sum of twenty thousand dollars ($20,000), to the payment of which sum, well and truly to be made, we do bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents.

Given under our hands and seals this fourth day of October, 1883.

The condition of this obligation is such that, Whereas, the above bounden Samuel H. Chittenden and George B. Chittenden in response to a public advertisement and notice, dated August 29, 1883, and given and published by Major G. J. Lydecker, Corps of Engineers, United States Army, have made and presented to Major G. J. Lydecker, Corps of Engineers, United States Army, a formal proposal, in writing, whereby they have proposed and agreed to enter into a contract with Major G. J. Lydecker, Corps of Engineers, United States Army, for construction of dam for increasing the water supply of Washington, D. C., according to the terms and conditions set forth in said advertisement and notice.

Now, therefore, if the said Samuel H. Chittenden and George B. Chittenden shall not withdraw their said proposal within sixty days from the date of opening the proposals, and shall within ten days from the date on which they may be notified that their said proposal had been accepted, and the said contract awarded to them (provide such award be made within the sixty days above mentioned), duly and formally enter into such contract agreeably to the terms of their said proposal, and into such bond for its due performance as shall be required of them, or if their said proposal shall not be accepted and such contract not be awarded them then this obligation shall be void, otherwise, that is to say, if either they shall withdraw their proposal within said sixty days, or fail to enter within said ten days into such contract if awarded them and into such bond, to remain in full force, effect, and virtue.

Witnesses:

J. W. BAKER.	SAMUEL H. CHITTENDEN.	[SEAL.]
J. W. BAKER.	GEO. B. CHITTENDEN.	[SEAL.]
JOHN E. BEALL.	H. S. CUMMINGS.	[SEAL.]
JOHN E. BEALL.	WALTER PARIS.	[SEAL.]

(Executed in triplicate.)

Justification of the sureties.

DISTRICT OF COLUMBIA,
County of Washington, ss:

I, Horace S. Cummings, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of twenty thousand dollars ($20,000) over and above all my debts and liabilities.

H. S. CUMMINGS.

Before me.
[SEAL.]

JOHN E. BEALL,
Notary Public.

DISTRICT OF COLUMBIA,
County of Washington, ss:

I, Walter Paris, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of twenty thousand dollars ($20,000) over and above all my debts and liabilities.

WALTER PARIS.

Before me.
[SEAL.]

JOHN E. BEALL,
Notary Public.

Certificate.

I, John E. Beall, a U. S. commissioner, do hereby certify that H. S. Cummings and Walter Paris, the sureties above named, are personally known to me, and that, to the best of my knowledge and belief, each is pecuniarily worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

JOHN H. BEALL, [SEAL.]
United States Commissioner.

[Committee No. 76.]

PROPOSAL OF STEPHENS, GERE, & CO.

SYRACUSE, N. Y., *October* 2, 1883.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

SIR: In accordance with your advertisement of August 29, 1883, inviting proposals for construction of dam for increasing the water supply of Washington, D. C., and subject to all the conditions and requirements thereof, and of your specifications of the same date, copies of both of which are hereto attached, and so far as they relate to this proposal, are made a part of it, we propose to furnish the materials and do the work at the following prices, viz:

Will furnish material for and place stone coping at thirty (30) dollars and no (no) cents per cubic yard.

If coping is furnished and dressed by the United States, will furnish the mortar, set and secure the stone in the work for fifteen (15) dollars and no (no) cents per cubic yard.

Will furnish material for and place cut stone masonry at sixteen (16) dollars and no (no) cents per cubic yard.

Will furnish material for and place concrete masonry at six (6) dollars and no (no) cents per cubic yard.

Will furnish stone filling, properly leveled in cribs, at twelve (12) dollars and fifty (50) cents per cord of 128 cubic feet.

Will furnish and place stone for riprap backing at twelve (12) dollars and no (no) cents per cord of 128 cubic feet.

Will furnish and place backing of clay and gravel, as required, at one (1) dollar and no (no) cents per cubic yard.

Will furnish pine timber and plank, framed and secured in the work, at forty-five (45) dollars and no (no) cents per thousand feet, B. M.

Will furnish oak timber, framed and secured in the work, at fifty-five (55) dollars and no (no) cents per thousand feet, B. M.

Will furnish wrought-iron drift bolts and cramps, secured in the work, at ten (10) cents per pound.

Will furnish all nails and spike in the work at ten (10) cents per pound.

Will do all excavation at one hundred fifty (150) cents per cubic yard.

Will clear trees, drift, and all rubbish, for a width of one hundred (100) feet, more or less, along the line of the new masonry dam for seventy-five (75) cents per square yard of area cleared.

The stone that we propose to furnish, as above, for coping and cut stone masonry is to be obtained from Seneca quarry, above the falls.

If permitted to take stone from the Seneca quarry, claimed by the Government, we will make the prices for masonry and stone work as follows:

For coping, twenty-nine (29) dollars and seventy-five (75) cents per cubic yard.

For cut-stone masonry, fifteen (15) dollars and seventy-five (75) cents per cubic yard.

For concrete masonry, six (6) dollars and no (no) cents per cubic yard.

For stone filling, two (2) dollars and fifty (50) cents per cubic yard.

For riprap backing, two (2) dollars and fifty (50) cents per cubic yard.

We make this proposal with a full knowledge of the kind, quantity, and quality o the materials and work required, and, if it is accepted, will, after receiving written notice of such acceptance, enter into contract within ten days, with good and sufficient sureties for the faithful performance thereof, and will commence active operations within ten days after the contracts are signed.

STEPHENS, GERE, & CO.,
City of Syracuse, County of Onondaga, New York.

In case of a firm, add names of partners: Clinton Stephens, Robert W. Gere, Charles E. Hubbell.

(Signed in triplicate.)

Bidder's bond.

Know all men by these presents that we, Clinton Stephens, Robt. W. Gere, Charles E. Hubbell, of Syracuse, N. Y., as principal, and R. Nelson Gere, of Syracuse, N. Y., and William T. Hamilton, of Syracuse, N. Y., as sureties, are held and bound unto the United States of America in the penal sum of twenty thousand dollars ($20,000), to the payment of which sum, well and truly to be made, we do bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents.

Given under our hands and seals this second day of October, 1883.

The condition of this obligation is such that whereas the above bounden Clinton Stephens, Robt. W. Gere, Charles E. Hubbell, in response to a public advertisement and notice, dated August 29, 1883, and given and published by Major G. J. Lydecker, Corps of Engineers, United States Army, have made and presented to Major G. J. Lydecker, Corps of Engineers, United States Army, a formal proposal, in writing, whereby they have proposed and agreed to enter into a contract with Major G. J. Lydecker, Corps of Engineers, United States Army, for construction of dam for increasing the water supply of Washington, D. C., according to the terms and conditions set forth in said advertisement and notice.

Now, therefore, if the said Clinton Stephens, Robt. W. Gere, Charles E. Hubbell, and Arnold shall not withdraw their said proposal within sixty days from the date of opening the proposals, and shall within ten days from the date on which they may be notified that their said proposal has been accepted, and the said contract awarded to them (provided such award be made within the sixty days above mentioned), duly and formally enter into such contract agreeably to the terms of their said proposal, and into such bond for its due performance as shall be required of them, or if their said proposal shall not be accepted and such contract not be awarded to them, then this obligation shall be void; otherwise, that is to say, if either of them shall withdraw their proposal within said sixty days, or fail to enter within said ten days into such contract if awarded to them and into such bond, to remain in full force, effect, and virtue.

CLINTON STEPHENS. [SEAL.]
ROBERT W. GERE. [SEAL.]
CHARLES E. HUBBELL. [SEAL.]
R. NELSON GERE. [SEAL.]
WILLIAM T. HAMILTON. [SEAL.]

Witnesses:
E. T. ALLEN.

(Executed in triplicate.)

Justification of the sureties.

STATE OF NEW YORK,
County of Onondaga, ss:

I, R. Nelson Gere, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of twenty thousand dollars ($20,000) over and above all my debts and liabilities.

R. NELSON GERE.

Subscribed and sworn to before me this 3d day of Oct., 1883.
[SEAL.] JOHN C. KEEFFE,
Notary Public.

STATE OF NEW YORK,
County of Onondaga, ss:

I, William T. Hamilton, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of twenty thousand dollars ($20,000) over and above all my debts and liabilities.

WILLIAM T. HAMILTON.

Subscribed and sworn to before me this 3d day of Oct., 1883.
[SEAL.] JOHN C. KEEFFE,
Notary Public.

Certificate.

I, A. Judd Northrup, U. S. C. C. Comm'r, do hereby certify that R. Nelson Gere and William T. Hamilton, the sureties above named, are personally known to me, and that, to the best of my knowledge and belief, each is pecuniarily worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

[SEAL.] A. JUDD NORTHRUP,
U. S. C. C. Commissioner North'n District of New York.

I, William O. Bunn, deputy collector int. rev., 21st dist., N. Y., hereby certify that R. Nelson Gere and William T. Hamilton, the above-named sureties, are personally known to me, and that, to the best of my knowledge and belief, each is pecuniarily worth, over and above all his debts and liabilities, the amount stated in the above affidavit by him subscribed.

WILLIAM O. BUNN,
Deputy Collector 21st Int. Rev. Dist., N. Y.

[Committee, No. 77.]

PROPOSAL OF HENRY L. CRANFORD.

WASHINGTON, D. C., *Oct. 5th*, 1883.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

SIR: In accordance with your advertisement of August 29, 1883, inviting proposals for construction of dam for increasing the water supply of Washington, D. C., and subject to all the conditions and requirements thereof, and of your specifications of the same date, copies of both of which are hereto attached, and, so far as they relate to this proposal, are made a part of it, I propose to furnish the materials and do the work at the following prices, viz:

Will furnish material for and place stone coping at forty-five (45) dollars and —— (——) cents per cubic yard.

If coping is furnished and dressed by the United States, will furnish the mortar, set and secure the stone in the work for two (2) dollars and fifty (50) cents per cubic yard.

Will furnish material for and place cut-stone masonry at thirty-nine (39) dollars and ——— (——) cents per cubic yard.

Will furnish material for and place concrete masonry at six (6) dollars and —— (——) cents per cubic yard.

Will furnish stone filling, properly leveled in cribs, at nine (9) dollars and —— (——) cents per cord of 128 cubic feet.

Will furnish and place stone for riprap backing at nine (9) dollars and ——— (——) cents per cord of 128 cubic feet.

Will furnish and place backing of clay and gravel as required at one (1) dollar and fifty (50) cents per cubic yard.

Will furnish pine timber and plank framed and secured in the work at forty (40) dollars and ——— (——) cents per thousand feet B. M.

Will furnish oak timber framed and secured in the work at fifty (50) dollars and ——— (——) cents per thousand feet B. M.

Will furnish wrought-iron drift-bolts and cramps secured in the work at five (5) cents per pound.

Will furnish all nails and spikes in the work at six (6) cents per pound.

Will do all excavation at one dollar (100) cents per cubic yard.

Will clear trees, drift, and all rubbish, for a width of one hundred (100) feet, more or less, along the line of the new masonry dam for ten (10) cents per square yard of area cleared.

The stone that I propose to furnish, as above, for coping and cut-stone masonry is to be obtained from Millstone Point.

If permitted to take stone from the Seneca Quarry, claimed by the Government, —— will make the prices for masonry and stone work as follows:

For coping, forty (40) dollars and ——— (——) cents per cubic yard.

For cut-stone masonry, thirty-four (34) dollars per cubic yard.

For concrete masonry, six (6) dollars per cubic yard.

For stone filling, nine (9) dollars per cord.

For riprap backing, nine (——) dollars and ——— (——) cents per cord.

I make this proposal with a full knowledge of the kind, quantity, and quality of the materials and work required, and, if it is accepted, will, after receiving written notice of such acceptance, enter into contract within ten days, with good and sufficient sureties for the faithful performance thereof, and will commence active operations within ten days after the contracts are signed.

HENRY L. CRANFORD,
Washington, District of Columbia.

In case of a firm, add names of partners.
(Signed in triplicate.)

Bidder's bond.

Know all men by these presents that we, H. L. Cranford, of Washington, D. C., as principal, and L. S. Filbert, of Philadelphia, Pa., and Lewis Clephane, of Washington, D. C., as sureties, are held and bound unto the United States of America, in the penal sum of twenty thousand dollars ($20,000), to the payment of which sum, well and truly to be made, we do bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents.

Given under our hands and seals this fifth day of October, 1883.

The condition of this obligation is such that whereas the above bounden H. L. Cranford, in response to a public advertisement and notice, dated August 29, 1883, and given and published by Major G. J. Lydecker, Corps of Engineers, United States Army, has made and presented to Major G. J. Lydecker, Corps of Engineers, United

States Army, a formal proposal, in writing, whereby he has proposed and agreed to enter into a contract with Major G. J. Lydecker, Corps of Engineers, United States Army, for construction of dam for increasing the water supply of Washington, D. C., according to the terms and conditions set forth in said advertisement and notice.

Now, therefore, if the said Henry L. Cranford shall not withdraw his said proposal within sixty days from the date of opening the proposals, and shall within ten days from the date on which he may be notified that the said proposal has been accepted, and the said contract awarded to him (provided such award be made within the sixty days above mentioned), duly and formally enter into such contract agreeably to the terms of the said proposal and into such bond for its due performance as shall be required of him, or if the said proposal shall not be accepted and such contract not be awarded to him, then this obligation shall be void; otherwise, that is to say, if either he shall withdraw his proposal within said sixty days or fail to enter within said ten days into such contract if awarded to him and into such bond, to remain in full force effect, and virtue.

Witnesses:

JOHN HARTIGAN. HENRY L. CRANFORD.
JOHN HARTIGAN. L. S. FILBERT.
JOHN HARTIGAN. LEWIS CLEPHANE.

(Executed in triplicate.)

Justification of the sureties.

WASHINGTON, D. C.,
County of ———, *ss:*

I, L. S. Filbert, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of seventy-five thousand dollars ($75,000), over and above all my debts and liabilities.

L. S. FILBERT.

Before me.
[SEAL.] N. CALLAN,
Not'y Public.

WASHINGTON, D. C.,
County of ———, *ss:*

I, Lewis Clephane, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of twenty thousand dollars ($20,000), over and above all my debts and liabilities.

LEWIS CLEPHANE.

Before me.
[SEAL.] N. CALLAN,
Not'y Public.

Certificate.

I. N. Callan, do hereby certify that ——— ——— and ——— ———, the sureties above named, are personally known to me, and that, to the best of my knowledge and belief, each is pecuniarily worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

N. CALLAN, *N. P.*

[Committee, No. 78.]

PROPOSAL OF CHARLES HART.

WASHINGTON, D. C., *Oct.* 20, 1883.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

SIR: In accordance with your advertisement of August 29, 1883, inviting proposals for construction of dam for increasing the water supply of Washington, D. C., and subject to all the conditions and requirements thereof, and of your specifications of the same date, copies of both of which are hereto attached, and, so far as they relate to this proposal, are made a part of it, I propose to furnish the materials and do the work at the following prices, viz.:

Will furnish material for and place stone coping at forty (40) dollars and ——— (——) cents per cubic yard.

If coping is furnished and dressed by the United States, will furnish the mortar, set and secure the stone in the work for twelve (12) dollars and ——— (——) cents per cubic yard.

Will furnish material for and place cut-stone masonry at thirty-five (35) dollars and ——— (——) cents per cubic yard.

Will furnish material for and place concrete masonry at six (6) dollars from adjoining quarries per cubic yard.

Will furnish stone filling, properly leveled in cribs, at eighteen (18) dollars per cord of 128 cubic feet.

Will furnish and place stone for rip-rap backing at twelve (12) dollars and —— (——) cents per cord of 128 cubic feet.

Will furnish and place backing of clay and gravel as required at three (3) dollars and —— (——) cents per cubic yard.

Will furnish pine timber and plank framed and secured in the work at one hundeed and sixty (160) dollars and —— (——) cents per thousand feet B. M.

Will furnish oak timber framed and secured in the work at one hundred and sixty dollars (160).

Will furnish wrought-iron drift-bolts and cramps secured in the work at ten (10) cents per pound.

Will furnish all nails and spike in the work at six (6) cents per pound.

Will do all excavation at thirty (30) cents per cubic yard.

Will clear trees, drift, and all rubbish, for a width of one hundred (100) feet, more or less, along the line of the new masonry dam for ten (10) cents per square yard of area cleared.

The stone that I propose to furnish, as above, for coping and cut-stone masonry is to be obtained from the best State of Maine Quarries.

If permitted to take stone from the Seneca Quarry, claimed by the Government, I will make the prices for masonry and stone work as follows:

For coping, thirty (30) dollars per cubic yard.

For cut-stone masonry, twenty-four (24) dollars and —— (——) cents per cubic yard.

For concrete masonry, six (6) dollars and —— (——) cents per cubic yard.

For stone filling eighteen (18) dollars and —— (——) cents per cubic yard.

For riprap backing, twelve (12) dollars and —— (——) cents per cubic yard.

I make this proposal with a full knowledge of the kind, quantity, and quality of the materials and work required, and, if it is accepted, will, after receiving written notice of such acceptance, enter into contract within ten days, with good and sufficient sureties for the faithful performance thereof, and will commence active operations within ten days after the contracts are signed.

CHARLES HART,
Brooklyn, Kings, New York.

In case of a firm, add names of partners.

(Signed in triplicate.)

Bidder's bond.

Know all men by these presents that we, Charles Hart, of Brooklyn, N. Y., as principal, and John Delmar, of Brooklyn, N. Y., and John H. O'Rourke, of Brooklyn, N. Y., as sureties, are held and bound unto the United States of America, in the penal sum of twenty thousand dollars ($20,000), to the payment of which sum, well and truly to be made, we do bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents.

Given under our hands and seals this 3d day of October, 1883.

The condition of this obligation is such that whereas the above bounden Charles Hart, in response to a public advertisement and notice, dated August 29, 1883, and given and published by Major G. J. Lydecker, Corps of Engineers, United States Army, has made and presented to Major G. J. Lydecker, Corps of Engineers, United States Army, a formal proposal, in writing, whereby he has proposed and agreed to enter into a contract with Major G. J. Lydecker, Corps of Engineers, United States Army, for construction of dam for increasing the water supply of Washington, D. C., according to the terms and conditions set forth in said advertisement and notice.

Now, therefore, if the said Charles Hart shall not withdraw his said proposal within sixty days from the date of opening the proposals, and shall within ten days from the date on which he may be notified that his said proposal has been accepted, and the said contract awarded to him (provided such award be made within the sixty days above mentioned), duly and formally enter into such contract agreeably to the terms of his said proposal, and into such bond for its due performance as shall be required of him, or if his said proposal shall not be accepted and such contract not be awarded him, then this obligation shall be void; otherwise, that is to say, if either he shall withdraw his proposal within said sixty days, or fail to enter within said ten days into such contract if awarded him and into such bond, to remain in full force, effect, and virtue.

Witness:

EDW'D E. UNDERWOOD.

CHARLES HART. [SEAL.]
JOHN DELMAR. [SEAL.]
JOHN H. O'ROURKE. [SEAL.]

(Executed in triplicate.)

Justification of the sureties.

STATE OF NEW YORK,
County of Kings, ss:

I, John Delmar, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of twenty thousand dollars ($20,000) over and above all my debts and liabilities.

JOHN DELMAR.

Before me.
[SEAL.]

EDWD. E. UNDERWOOD,
Notary Public, Kings Co., N. Y.

STATE OF NEW YORK,
County of Kings, ss:

I, John H. O'Rourke, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of twenty thousand dollars ($20,000) over and above all my debts and liabilities.

JOHN H. O'ROURKE.

Before me.
[SEAL.]

EDWD. E. UNDERWOOD,
Notary Public, Kings Co., New York.

Certificate.

I, Edw. E. Underwood, do hereby certify that John Delmar and John H. O'Rourke, the sureties above named, are personally known to me, and that, to the best of my knowledge and belief, each is pecuniarily worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

EDWD. E. UNDERWOOD,
Notary Public, Kings Co., N. Y.
M. J. DADY,
Supt. U. S. Building, N. Y.

[Committee No. 79.]

PROPOSAL OF JOHN BEATTIE.

LEETE'S ISLAND, *New Haven Co., Conn., Oct. 2d,* 1883.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

SIR: In accordance with your advertisement of August 29, 1883, inviting proposals for construction of dam for increasing the water supply of Washington, D. C., and subject to all the conditions and requirements thereof, and of your specifications of the same date, copies of both of which are hereto attached, and, so far as they relate to this proposal, are made a part of it, I propose to furnish the materials and do the work at the following prices, viz:

Will furnish material for and place stone coping at thirty-four (34) dollars and seventy-five (75) cents per cubic yard.

If coping is furnished and dressed by the United States, will furnish the mortar, set and secure the the stone in the work for seven (7) dollars and seventy-five (75) cents per cubic yard.

Will furnish material for and place cut-stone masonry at twenty-eight (28) dollars and forty (40) cents per cubic yard.

Will furnish material for and place concrete masonry at ten (10) dollars and fifty (50) cents per cubic yard.

Will furnish stone filling, properly leveled in cribs, at eight (8) dollars and sixty (60) cents per cord of 128 cubic feet.

Will furnish and place stone for riprap backing at eight (8) dollars and ten (10) cents per cord of 128 cubic feet.

Will furnish and place backing of clay and gravel as required at wo (02) dollars and twenty-five (25) cents per cubic yard.

Will furnish pine timber and plank framed and secured in the work at ninety-four (94) dollars and fifty (50) cents per thousand feet B. M.

Will furnish oak timber framed and secured in the work at ninety-eight (98) dollars and fifty (50) cents per thousand feet B. M.

Will furnish wrought-iron drift bolts and cramps secured in the work at sixteen (16) cents per pound.

Will furnish all nails and spikes in the work at ten (10) cents per pound.

Will do all excavation at ninety-five (95) cents per cubic yard.

Will clear trees, drift, and all rubbish, for a width of one hundred (100) feet, more or less, along the line of the new masonry dam for twenty (20) cents per square yard of area cleared.

The stone that I propose to furnish, as above, for coping and cut-stone masonry is to be obtained from my granite quarries at Leetes Island, Ct.

If permitted to take stone from the Seneca quarry, claimed by the Government, —— will make the prices for masonry and stone work as follows:

For coping ——— (——) dollars and ——— (——) cents per cubic yard.
For cut-stone masonry ——— (——) dollars and ——— (——) cents per cubic yard.
For concrete masonry ——— (——) dollars and ——— (——) cents per cubic yard.
For stone filling ——— (——) dollars and ——— (——) cents per cubic yard.
For riprap backing ——— (——) dollars and ——— (——) cents per cubic yard.

—— make this proposal with a full knowledge of the kind, quantity, and quality of the materials and work required, and, if it is accepted, will, after receiving written notice of such acceptance, enter into contract within ten days, with good and sufficient sureties for the faithful performance thereof, and will commence active operations within —— days after the contracts are signed.

JOHN BEATTIE,
Leete's Island, New Haven, Connecticut.

In case of a firm, add names of partners.
(Signed in triplicate.)

Bidder's bond.

Know all men by these presents that we, John Beattie, of Leete's Island, Ct., as principal, and Prentice P. Avoy, of New Haven, and Edward H. Chatfield, of New Haven, as sureties, are held and bound unto the United States of America, in the penal sum of twenty thousand dollars ($20,000), to the payment of which sum, well and truly to be made, we do bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents.

Given under our hands and seals this second day of Oct., 1883.

The condition of this obligation is such that, whereas the above bounden* ——— ———, in response to a public advertisement and notice, dated August 29, 1883, and given and published by Major G. J. Lydecker, Corps of Engineers, United States Army, ha— made and presented to Major G. J. Lydecker, Corps of Engineers, United States Army, a formal proposal, in writing, whereby —he— ha— proposed and agreed to enter into a contract with Major G. J. Lydecker, Corps of Engineers, United States Army, for construction of dam for increasing the water supply of Washington, D. C., according to the terms and conditions set forth in said advertisement and notice:

Now, therefore, if the said John Beattie shall not withdraw† —— said proposal within sixty days from the date of opening the proposals, and shall within ten days from the date on which —— may be notified that —— said proposal has been accepted, and the said contract awarded to —— (provided such award be made within the sixty days above mentioned), duly and formally enter into such contract agreeably to the terms of —— said proposal, and into such bond for its due performance as shall be required of ——, or if —— said proposal shall not be accepted and such contract not be awarded —— then this obligation shall be void, otherwise, that is to say, if either —— shall withdraw —— proposal within said sixty days, or fail to enter within said ten days into such contract if awarded —— and into such bond, to remain in full force, effect, and virtue.

JOHN BEATTIE. [SEAL.]
PRENTICE P. AVOY. [SEAL.]
E. H. CHATFIELD. [SEAL.]

Witnesses:
J. T. WILDMAN.
A. H. KELLEM.
A. H. KELLEM.

(Executed in triplicate.)

* Insert full name of each bidder or partner.
† Fill remaining blanks with the words "he," "his," or "him," "they," "their," or "them," as the sense demands.

Justification of the sureties.

STATE OF CONNECTICUT,
County of New Haven, ss:

I, Prentice P. Avoy, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of twenty thousand dollars ($20,000) over and above all my debts and liabilities.

PRENTICE P. AVOY.

Before me, this 2d October, 1883.

A. H. KELLEM,
D'y Collector.

STATE OF CONNECTICUT,
County of New Haven, ss:

I, Edward H. Chatfield, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of twenty thousand dollars ($20,000) over and above all my debts and liabilities.

E. H. CHATFIELD.

Before me, this 2d Oct., 1883.

A. H. KELLEM,
D'y Collector.

Certificate.

I, A. H. Kellem, do hereby certify that Prentice P. Avoy and E. H. Chatfield, the sureties above named, are personally known to me, and that, to the best of my knowledge and belief, each is pecuniarily worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

A. H. KELLAM,
D'y Collector.

[Committee No. 80.]

PROPOSAL OF JOHN HUMBIRD AND THOMAS P. MORGAN.

CUMBERLAND, MD, *October 3d*, 1883.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

SIR: In accordance with your advertisement of August 29, 1883, inviting proposals for construction of dam for increasing the water supply of Washington, D. C., and subject to all the conditions and requirements thereof, and of your specifications of the same date, copies of both of which are hereto attached, and, so far as they relate to this proposal, are made a part of it, we propose to furnish the matarials and do the work at the following prices, viz:

Will furnish material for and place stone coping at fifty (50) dollars per cubic yard.

If coping is furnished and dressed by the United States, will furnish the mortar, set and secure the stone in the work for four (4) dollars and five (5) cents per cubic yard.

Will furnish material for and place cut-stone masonry at forty-eight (48) dollars per cubic yard.

Will furnish material for and place concrete masonry at six (6) dollars per cubic yard.

Will furnish stone filling, properly leveled in cribs, at twelve (12) dollars per cord of 128 cubic feet.

Will furnish and place stone for riprap backing at fifteen (15) dollars per cord of 128 cubic feet.

Will furnish and place backing of clay and gravel as required at two (2) dollars per cubic yard.

Will furnish pine timber and plank framed and secured in the work at one hundred and fifty (150) dollars per 1,000 feet B. M.

Will furnish oak timber framed and secured in the work at one hundred and fifty (150) dollars per thousand feet B. M.

Will furnish wrought-iron bolts and cramps secured in the work at four (4) cents per pound.

Will furnish all nails and spikes in the work at four (4) cents per pound.

Will do all excavation at one dollar (100) cents per cubic yard.

Will clear trees, drift, and all rubbish, for a width of one hundred (100) feet, more or less, along the line of the new masonry dam for fifty (50) cents per square yard of area cleared.

The stone that we propose to furnish, as above, for coping and cut-stone masonry is to be obtained from Mt. Waldo Granite Works quarries, approved by and used by the United States.

We make this proposal with a full knowledge of the kind, quantity, and quality of the material and work required, and, if it is accepted, will, after receiving written notice of such acceptance, enter into contract within ten days, with good and sufficient sureties for the faithful performance thereof, and will commence active operations within 10 days after the contracts are signed.

JOHN HUMBIRD,
Town of Cumberland, County of Alleghany, State of Maryland.

In case of a firm, add names of partners: Thomas P. Morgan, Washington, D. C. Partners doing business as Humbird & Morgan.

(Signed in triplicate.)

Bidder's bond.

Know all men by these presents, that we, John Humbird, of Cumberland, Md., and Thos. P. Morgan, of Washington, D. C., as principals, and Jacob Humbird, of Cumberland, Md., and William E. Weber, of Cumberland, Md., as sureties, are held and bound unto the United States of America in the penal sum of twenty thousand dollars ($20,000), to the payment of which sum, well and truly to be made, we do bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents.

Given under our hands and seals this third day of Oct., 1883.

The condition of this obligation is such, that whereas the above-bounden John Humbird and Thos. P. Morgan in response to a public advertisement and notice, dated August 20, 1883, and given and published by Major G. J. Lydecker, Corps of Engineers, United States Army, have made and presented to Major G. J. Lydecker, Corps of Engineers, United States Army, a formal proposal, in writing, whereby they have proposed and agreed to enter into a contract with Major G. J. Lydecker, Corps of Engineers, United States Army, for construction of dam for increasing the water supply of Washington, D. C., according to the terms and conditions set forth in said advertisement and notice.

Now, therefore, if the said John Humbird and Thomas P. Morgan, shall not withdraw their said proposal within sixty days from the date of opening the proposals, and shall, within ten days from the date on which they may be notified that their said proposal has been accepted and the said contract awarded to them (provided such award be made within the sixty days above mentioned), duly and formally enter into such contract agreeably to the terms of their said proposals, and into such bond for its due performance as shall be required of them, or if their said proposal shall not be accepted, and such contract not be awarded them, then this obligation shall be void; otherwise, that is to say, if either they shall withdraw their proposal within said sixty days, or fail to enter, within said ten days, into such contract if awarded them and into such bond, to remain in full force, effect, and virtue.

THOS. P. MORGAN. [SEAL.]
JOHN HUMBIRD. [SEAL.]
JACOB HUMBIRD. [SEAL.]
WILLIAM E. WEBER. [SEAL.]

Witnesses:
THOS. P. MORGAN, JR.
THOS. E. GAUDER, as to Jacob Humbird and Wm. E. Weber.
(Executed in triplicate.)

Justification of the sureties.

STATE OF MARYLAND, *County of Allegany, ss:*

I, Jacob Humbird, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of twenty thousand dollars ($20,000) over and above all my debts and liabilities.

JACOB HUMBIRD.

Before me, Oct. 3d, 1883.
[SEAL.]

THOS. E. GAUDER.
a Notary Public.

STATE OF MARYLAND, *County of Alegany, ss:*

I, William E. Weber, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of twenty thousand dollars ($20,000) over and above all my debts and liabilities.

WILLIAM E. WEBER.

Before me, Oct. 3d, 1883.
[SEAL.]

THOS. E. GAUDER,
a Notary Public.

Certificate.

I, Henry J. Johnson, do hereby certify that Jacob Humbird and William E. Weber, the sureties above named, are personally known to me, and that, to the best of my knowledge and belief, each is pecuniarily worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

HENRY J. JOHNSON,
Postmaster, Cumberland, Md.

[Committee No. 81.]

PROPOSAL OF HOOPES ARTIFICIAL STONE COMPANY.

BALTIMORE, MD., *October 4th*, 1883.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.

SIR: In accordance with your advertisement of August 29, 1883, inviting proposals for construction of dam for increasing the water supply at Washington, D. C., and subject to all the conditions and requirements thereof, and of your specifications of the same date, copies of both of which are hereto attached, and, so far as they relate to this proposal, are made a part of it, we propose to furnish the materials and do the work at the following prices, viz:

Will furnish material for, and place stone coping, at fourteen (14) dollars per cubic yard for the present dam.

Will furnish stone filling, properly leveled in cribs, at four (4) dollars per cord of 128 cubic feet.

Will furnish and place stone for riprap backing at four (4) dollars per cord of 128 cubic feet.

Will furnish and place backing of clay and gravel, as required, at three (3) dollars per cubic yard.

Will furnish pine timber and plank, framed and secured in the work, at sixty (60) dollars per thousand feet, B. M.

Will furnish oak timber, framed and secured in the work, at sixty (60) dollars per thousand feet, B. M.

Will furnish wrought-iron drift-bolts and cramps, secured in the work, at five (5) cents per pound.

Will furnish all nails and spike in the work at five (5) cents per pound.

Will do all excavation, at ninety-nine (99) cents per cubic yard.

Will clear trees, drift, and all rubbish, for a width of one hundred (100) feet, more or less, along the line of the new masonry dam for six (6) cents per square yard of area cleared.

The stone that we propose to furnish, as above, for coping and cut-stone masonry is to be obtained on the ground.

We make this proposal with a full knowledge of the kind, quantity, and quality of the materials and work required, and, if it is accepted, will, after receiving written notice of such acceptance, enter into contract within ten days, with good and sufficient sureties for the faithful performance thereof, and will commence active operations within ten days after the contracts are signed.

HOOPES A. S. C. & P. COMPANY.
Pres'd't.

Town of Baltimore, 84 N. Eutaw St., County of Baltimore, State of Maryland.

Masonry Dam A.

We will build the dam of the required length, breadth, and height, as described in the specifications to which this is attached, the material to be Hoopes "Beton Coignet," for the sum of fourteen dollars ($14) per cubic yard; the coping being incorporated or made with the body of the dam is also included in the above price. The materials used in the constructions shall conform in quality to the standard described in the specifications to which this is attached.

We guarantee the work for five years.

HOOPES ARTIFICIAL STONE, CEMENT & PAINT CO.,
WM. H. HOOPES, *Pres'd't.*

Justification of the sureties.

STATE OF ———
County of ———, *ss:*

I, ——— ———, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of ——— thousand dollars ($——) over and above all my debts and liabilities.

[Signature of surety.] ——— ———

Before me.
[Signature of officer administering oath, with seal, if any.] ——— ———

STATE OF ———
County of ———, *ss:*

I, ——— ———, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of ——— thousand dollars ($——) over and above all my debts and liabilities.

[Signature of surety.] ——— ———

Before me.
[Signature of officer administering oath, with seal, if any.] ——— ———

Certificate.

I, ——— ———, do hereby certify that ——— ——— and ——— ———, the sureties above mentioned, are personally known to me, and that, to the best of my knowledge and belief, each is pecuniarily worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

[Signature of certifying official.] ——— ———

NOTE.—The certificate may be given separately as to each surety and modified accordingly.

[Committee No. 82.]

Advertisement, instructions, specifications, proposals, and bidder's bond for construction of dam for increasing the water supply of Washington, D. C.

[Advertisement.]

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., August 29, 1883.

Sealed proposals, in triplicate, for the work required for increasing the water supply of the city of Washington, in accordance with the act of Congress approved July 15th, 1882, will be received at this office until 12 o'clock noon, on Friday, October 5th, 1883, when they will be publicly opened; the work to be done comprises three different classes, viz:

Class A—Dam construction.—This consists (1st) of raising the present masonry dam across the Maryland channel of the Potomac River at the Great Falls by a coping 15 inches thick; (2d) the extension of the dam across Conn's Island by a masonry structure about 1,120 feet long with an average height of about 6 feet; and (3d) the farther extension of the dam about 450 feet across the Virginia channel by a substructure of crib-work filled with stone, and a superstructure of masonry, together with about 300 feet of masonry dam to make connection with the Virginia shore.

* * * * * * *

Separate proposals, in triplicate, must be made for each class. Parties proposing to bid will apply at this office for blanks for proposals, specifications, and all information, being careful to state for which class or classes of work blanks are desired; but they will be furnished only to such parties as show *prima facie* evidence that they are able, financially, and by experience, to undertake the work on which they propose to bid.

Each bidder must submit with his proposals written evidence on which he relies to establish his capacity to perform the work, reference being had to his experience on work of like character, to the plant at his disposal and which he proposes to use, and to his financial ability to do all that is necessary for a rapid prosecution of the work. Before proposals are opened each bidder must certify to the undersigned that either personally or by a duly authorized agent he has inspected the natural features of the locality in which the work is located and examined the drawings on file in this office.

The right is reserved to reject any and all bids or parts of bids.

G. J. LYDECKER,
Major of Engineers, U. S. A.

General instructions for bidders.

1. All proposals must be in triplicate, on the accompanying form. They must be enclosed in a sealed envelope, and endorsed "Proposals for construction of dam." This parcel should then be placed inside a second envelope and be addressed to *Office of the Washington Aqueduct, Georgetown Station, Washington, D. C.* No responsibility shall attach to the officer in charge for the premature opening of any proposal not endorsed as above directed.

2. The bidder's bond—executed in triplicate—must be signed by two (2) responsible sureties in the sum of twenty thousand dollars ($20,000), to be certified to as good and sufficient sureties by a United States district attorney, collector of customs, or any other officer under the United States Government, or responsible person known to this office.

3. A firm will not be accepted as a surety nor will a partner be accepted as surety for a co-partner or for a firm of which he is a member.

4. An officer of a corporation will not be accepted as surety for such corporation.

5. Where firms bid, the individual names of the members should be written out, and should be signed in full, giving the Christian names; but the signers may, if they choose, describe themselves, in addition as doing business under a given name and style as a firm.

6. Signatures of obligor and sureties to bidder's bond must have affixed to them seals of wax or wafer.

7. The place of residence of every bidder, with county and State, must be given after his signature, which must be written in full.

8. Any one signing a proposal as the agent of another, or of others, must file with it legal evidence of his authority so to do.

9. Alterations by erasures or interlineations should be explained or noted in the proposal over the signature of the bidder.

10. If a bidder wishes to withdraw his proposal, he may do so before the time fixed for the opening, without prejudice to himself, by communicating his purpose in writing to the officer who holds it, and when his proposal is reached, it will be handed to him or his authorized agent, unread.

11. All prices must be written as well as expressed in figures.

12. The contract which the bidder promises to enter into shall be in the form adopted and in use by the Engineer Department of the Army, blank forms of which can be inspected at this office. Parties making bids are to be understood as accepting the terms and conditions contained in such form of contract.

13. Reasonable grounds for supposing that any bidder is interested in more than one bid for the same item will cause the rejection of all bids in which he is interested.

14. The United States reserves the right to reject any and all bids; also to disregard the bid of any *failing bidder or contractor*, known as such to the Engineer Department.

15. The bidder must satisfy the United States Engineer in charge of his ability to furnish the materials or perform the work for which he bids. The character of the machinery to be used and the capacity and standing of the bidder will be considered in making the award.

16. Transfers of contracts or of interests in contracts are prohibited by law.

17. Bidders are invited to be present at the opening of the bids.

SPECIFICATIONS.

The work to be done consists in completing the present dam at the Great Falls of the Potomac River to a level of one hundred and forty-eight (148) feet above tide, and extending the same to the Virginia shore. The completion of the present dam is to be accomplished by placing a stone coping fifteen (15) inches thick and about one thousand and sixty (1,060) feet long; the extension involves the construction of a masonry dam across Conn's Island to deep water in the Virginia channel and from the opposite site of said channel to the Virginia shore, and of a crib dam with a masonry superstructure across the deep water of the Virginia channel. The masonry dam in this extension will have an aggregate length of about fourteen hundred and sixty (1,460) feet, and an average height of about six (6) feet; the crib dam will be about four hundred and fifty (450) feet long, placed in water whose average depth is about twelve (12) feet and greatest depth nineteen (19) feet at ordinary low-water stages.

Unless hereafter otherwise directed the order of the work will be: First, the construction of the masonry dam to such height as may be directed by the U. S. engineer; second, the construction of the crib dam across the deep water of the Virginia channel with its superstruction and coping complete; third, the completion of the masonry dam, and finally the coping of the present dam.

A.—Masonry dam.

Clearing and excavating.—The work will be commenced by clearing the ground across Conn's Island of all trees, drift, &c., along the line of the dam for a width of one hundred (100) feet, and removing the same, together with refuse of every kind, from this area in such manner as to prevent any interference with the future progress of the work. The material overlaying bed rock will then be removed for such width as is required for the foundation of the dam and deposited in spoil banks, as directed by the United States engineer; stumps, logs, and refuse encountered in this excavation will be removed from the cleared area, as heretofore provided; earth and stone will be placed in separate spoil banks. The width of excavation for the above purpose will be about fourteen (14) feet at bottom, with side slopes of 1 base to 1 vertical, and its average depth probably eight (8) feet. Bed rock having been uncovered, the foundation bed for the dam will be prepared by removing all loose or disintegrated rock, and finished in offsets, or in such other manner as, in the opinion of the United States engineer, may be necessary to obtain a proper bed for the dam. The foundation bed for that portion of the masonry dam included between Conn's Island and the Virginia shore must be prepared for receiving the dam in the manner heretofore described. Seams and fissures in the bed rock, within the limits of the foundation bed, must be cleaned out and filled with cement-mortar, or concrete, as the case may require; all the cost for preparing the bed as required above will be included in the price paid for masonry. During the process of preparing the foundation bed and laying the masonry of the dam the area of the bed must be kept clear of water by sufficient embankments, coffer-dams, and pumps. In constructing the masonry of the dam the contractor will not be allowed to work under water.

Masonry.—The dam will be eight (8) feet wide at top, with a vertical face down stream, the up-stream face having a slope of ¼ or two (2) vertical to one (1) horizontal. The down-stream facing and the up-stream facing for a depth of two (2) courses below the coping, will be laid in regular courses not less than twelve (12) inches in thickness. The stone will be not less than four (4) feet long and three (3) feet wide; they will be dressed to give mortar joints of not more than three-eighths (⅜) of an inch, beds horizontal, and vertical joints perpendicular to beds and face; they will be quarry faced, with a draft of one (1) inch along the face edges. The rise of each course—both on the up and down stream sides—will be uniform throughout, and the stone will be laid alternately as header and stretcher, in each course and in contiguous courses, in such manner that headers in the up-stream face will be opposite stretchers in the down-stream face; vertical joints in each course to be as nearly midway between those in the course below as practicable, and in no case to approach the latter closer than eight (8) inches. Each stone must be properly dressed to fit in its place before it is raised on the dam, and it must be raised and lowered directly into position by suitable machinery; moving stone about on the dam will not be allowed.

Before any stone is placed all beds and joints must be carefully cleansed of dust and of all adhering particles of foreign matter, beds and joints properly moistened, and each stone laid in full mortar evenly spread over bed and joint.

The body of dam will be of concrete, placed in layers six (6) inches thick, and carefully rammed; it will follow close after the placing of the facing, but not until the mortar in the joints has set. The facing of the top courses will be secured by iron bolts and cramps, as indicated on drawings.

The coping of the dam will be eight (8) feet and three (3) inches wide, of uniform thickness not less than twelve (12) inches, and the minimum length of stone, in the direction of the axis of the dam, will be such that its cubic contents shall be not less than forty (40) cubic feet; but in no case shall this length be less than four (4) feet. In all other respects the coping will be as hereinafter described for the coping of the present dam.

B.—Dam across the Virginia channel.

General requirements.—The crib-work of this structure will be made up of separate cribs, the object being to put in place a crib substructure whose upper surface shall be level at an elevation of one hundred and forty-five (145) feet above tide, or three (3) feet below the crest of the masonry superstructure. To this end the contractor will be required to remove loose rock and boulders along the line of the dam, and build the bottom of his crib-work to conform with the irregularities of the river bed, so that when the crib is sunk in position its upper surface will be level at the elevation hereinbefore mentioned; but no allowance beyond the amount paid for material in the dam will be made for any of this work. Each crib will be built to its full height before being taken to its position and sunk; it will be sunk into place by loading stone on the top until the crib is brought solidly to its bearing on the bottom; if it should then be found that the crib is out of line or level, it will be lightered and floated again, if necessary to correct the trouble, and this operation will be repeated

as often may be found necessary to accomplish the object in view. Each crib must be closely in contact with that next to it, must be level, in accurate line, and solidly filled with stone before it will be accepted.

In general, where the river bed is below the elevation of one hundred and thirty-six (136) feet, the crib will be built in length of thirty (30) feet, twenty-four (24) feet wide up to an elevation of one hundred and forty (140) feet above tide, and thence sixteen (16) feet wide to the elevation of one hundred and forty-five (145) feet aforesaid; the deepest central crib will be placed first. Where the elevation of the river bed is at or above one hundred and thirty-six (136) feet the cribs will be sixteen (16) feet in width, and of such lengths, not less than thirty (30) feet, as may be directed by the United States engineer. The drawings in this office show approximately the lengths and widths of the cribs of which the dam is to be composed.

Crib-work.—The cribs must be constructed in exact accordance with the detailed drawings furnished by the U. S. engineer, or as he may direct, with reference to any point not clearly shown thereby or by these specifications. All cross-ties will be single sticks, in length equal to the width of crib; wall sticks will be in single lengths for cribs thirty (30) feet or less in length; for longer cribs they will be in lengths of not less than sixteen (16) feet, and so distributed as to break joints in contiguous courses by at least two (2) feet, and so that the joints will not come within two (2) feet of any gain or dovetail, except where the distance between gains is less than four (4) feet, in which case the intermediate joint will be equidistant from the gain on each side of it. When butt joints are made by wall sticks in the same crib, a block twenty (20) inches long will be placed under the joint, in the space below the abutting timbers, and secured by drift-bolts thirty (30) inches long passing through the said timbers, the block, and into the timber course below. Dovetail joints must be carefully framed, so that the tenons will fit tightly into gains, shoulders of ties bear solidly against crib walls, and ends of ties be flush with the outer face of cribs, excepting where they are required to be prolonged beyond. The system of bolting shown on drawings must be strictly adhered to; drift-bolts of one (1) inch round iron must be driven through holes bored for the full length of the bolts with an auger fifteen-sixteenths ($\frac{15}{16}$) of an inch in diameter. After all the cribs are in position the up-stream face will be double sheathed with plank placed vertically; the interior sheathing will be one (1) inch thick and the outer sheathing two (2) inches thick, so placed as to cover the inner joints by at least four (4) inches; the lower ends of outer sheathing will be beveled, and each plank will be solidly driven down on the river bed before it is spiked in position; each of the interior sheathing plank will be secured to top course of crib by two (2) ten-penny cut nails, and each outer plank by two (2) eight (8) inch cut spikes.

Superstructure.—After the sheathing is secured the masonry superstructure must be placed as rapidly as possible, and all the stone for this purpose must have been cut and prepared for its place in the work by the time the sheathing of the dam is commenced. The superstructure will rest on a platform, composed of three (3) inch and four (4) inch plank, built as shown on drawings; this platform will be secured to the top of the crib substructure by not less than two (2) six (6) inch spikes in each plank at its crossings with each tie, and it must be truly level throughout. Before placing this platform the underlying stone filling of crib must be carefully leveled by hand and packed in with small stone so as to make this filling flush with the tops of ties. The masonry will consist—1st, of a bed of hydraulic cement-mortar leveled at one (1) inch above the four (4) inch plank in the platform; 2d, a masonry course comprising an up and down stream face of cut stone with a continuous concrete filling between faces; the stone for facing will be not less than three (3) feet wide and four (4) feet long, all laid as stretchers in a bed of fresh hydraulic mortar one-half ($\frac{1}{2}$) inch thick, placed on the general mortar bed; the concrete filling will be thoroughly rammed in courses not more than six (6) inches thick, and be brought to the level of the stone facing; after the concrete is placed the stone of opposite facing will be tied together by iron cramps, as shown on drawings. The thickness of this course will be uniform, and such that its top will be at the proper level for receiving the coping course; 3d, a coping course, which will be in all respects like that of the masonry dam heretofore described. None of this masonry will be built in water, and to aid in this work the sheathing of cribs may be left projecting above the water surface until the lower course of masonry has been laid, if the stage of water in the river admits of so doing; the sheathing will be then sawed off to the level of the top of this course, and a temporary stop plank used to divert the water as the coping course is laid and while the mortar in joints and bed of that course is setting, but no payment will be made to the contractor for the sheathing left projecting above the top course of the crib-work. If the stage of water makes the above method impracticable, the contractor will be required to use such coffer work as will accomplish the desired object. An apron of oak timbers, six (6) inches by six (6) inches, built as shown on drawings, will complete the superstructure of the dam; the capping timbers to which these pieces are secured will also be of oak; the apron timbers will be secured by wrought-

iron boat-spikes, twelve (12) inches long and one-half (½) inch square, holes seven-sixteenths (7/16) of an inch in diameter having been bored through the six (6) inch by six (6) inch timbers before placing the spikes, which must be driven so that their heads are below the surface of timbers. The stone filling under this apron will be carefully placed by hand, so as to be solid up to its lower surface before the timbers are placed.

The dam must connect water-tight at its ends with the adjacent masonry dam, and to aid in this purpose the extreme ends of the outer cribs will be built solid and filled with concrete, in lieu of stone, placed by suitable buckets with trap bottoms, or through chutes, in such manner as not to impair the quality of the concrete mass; suitable provisions will then be made for excluding the water from the space included between this mass and the adjacent masonry dam or natural rock in place, as the case may be, and this space will then be carefully filled with concrete in such manner as to make water-tight connection satisfactory to the United States engineer.

C.—*Coping for present dam.*

This dam is a masonry structure one thousand and sixty (1,060) feet long, and the work to be done consists in placing a stone coping eight (8) feet and three (3) inches wide and fifteen (15) inches thick, laid in hydraulic cement, and secured by iron bolts and cramps.

Each stone will be eight (8) feet three (3) inches long, fifteen (15) inches thick, and not less than four (4) feet wide; they will be laid entirely as through headers, each stone covering the entire width of dam and projecting three (3) inches beyond its down-stream face.

The stone will be truly squared and dressed to the shape shown by drawings; the cutting of beds and joints will be such as to admit of laying with one-quarter (¼) inch mortar joints, the upper surface and edge rough pointed and the down-stream surface quarry faced, with a chiseled draught one (1) inch wide along the edges; top and bottom surfaces parallel, and vertical joints perpendicular to faces and beds. All cutting and dressing must be completed before the stone is brought to its place on the work, and it must be put in place by suitable machinery, without being moved about on the dam.

Before any stone is placed in position the top surface of the present dam must be cleared of all loose stone, loose or disintegrated mortar and dirt, and properly leveled, so as to afford a firm and solid bed; when the stone is laid its beds and joints and the top surface of the dam must be carefully cleaned and moistened, and it must be lowered directly to its place in a full bed of hydraulic mortar one-quarter (¼) inch thick spread uniformly over bed and joint. Each stone must be secured to the body of the dam and to each other, by bolts and cramps, as shown by drawings; bolts and cramps will be secured by a cement of lead and antimony, in the proportion of eighty-five (85) parts of lead to fifteen (15) of antimony. Until the work of placing this coping is commenced, the contractor will be authorized to use the present dam as a road-bed for railway to transport material to be used on other parts of the work.

Material.

All material used in any of the foregoing work must be of best quality of its kind and satisfy the following conditions. It will all be carefully inspected before being placed in the work, under the directions of the United States engineer, and such as is not satisfactory must be removed from the site of the work by the contractor. The contractor will be required to furnish all labor necessary to handle material, and to aid the inspector in his inspections.

Timber and plank—Must be straight and sound, sawed accurately to required dimensions, free from excessive wane, shake, splits, rot, black or decayed knots, or other imperfections by which its strength and durability may be impaired.

Stone—Must be of sound and durable character, such as shall be approved by the United States engineer, and must be free from splits or any defects tending to impair its strength and durability. No stone liable to disintegration under water will be taken, nor will stone quarried during the winter or at a time when it is liable to be affected by frost be accepted. *The locality of the quarry from which it is proposed to obtain the stone must be distinctly stated by the bidder in his proposal.* The least dimension of stone used for curb filling must not be less than ten (10) inches; boulders and other stone found in the vicinity will probably supply what is needed for this purpose—but all light, flat, or shaly stone will be rejected. Riprap stone, not confined in the cribs, must be of similar character, but larger in size, each being, in general, such as to require two (2) men to handle it. All stone to be used for riprap or crib filling must be carefully piled in some position convenient to the work, so that it may be accurately measured by the inspector before it is used in the work. The

right is reserved by the United States to furnish to the contractor the *coping stone* required for the work, if, in the opinion of the United States engineer, such course is advisable; in this case the stone will be delivered to the contractor on the banks of the Chesapeake and Ohio Canal adjoining the work; it will be hauled therefrom by the contractor who is to place it, and will be dressed by the United States in readiness to be placed in the work.

Iron.—For bolts and cramps will be of best quality American wrought-iron, free from all defects; drift-bolts for crib-work will be of one (1) inch round iron, slightly pointed and swedged, or headed, to a diameter of not less than one and one-quarter (1¼) inches.

Cement.—The cement used must be equal to the best brand of Cumberland cement, and must show a tensile strength of seventy-five (75) pounds per square inch after it has been mixed with water, allowed to set and then immersed in water for twenty-four (24) hours. It must be firmly ground, freshly burned, and sufficiently slow setting to admit of working into concrete, and being put into position without loss of strength through premature setting.

Sand.—All sand must be clear, sharp, and angular, and absolutely free from clay or other foreign matter. The use of bank sand will not be allowed. Sand used for concrete must be coarse, and that for mortar in brick and stone masonry must be sufficiently fine to make suitable joints of the required dimensions.

Water.—The water used for mortar and concrete must be free from clay, earth, or other impurities.

Mortar.—Mortar, whenever used in this work, must be composed of sand and cement in the proportion of one barrel—three hundred (300) pounds—of cement and two (2) barrels of loose sand; these ingredients will be thoroughly mixed dry, and a sufficient quantity of water afterward added to form a rather stiff paste; it will be used within one (1) hour after mixing, and not at all if once set. All mortar must be mixed and made in tight boxes provided by the contractor.

Concrete.—All concrete used on the work will be made as follows: One measure of cement will be thoroughly mixed dry, with two measures of sand, water will then be added to make a mortar, and four measures of broken stone will be thoroughly incorporated with the mortar. The resulting concrete must be free from surplus water, but thoroughly moistened throughout, and the voids between stones completely filled by the mortar, with mortar in excess. The broken stone used for this purpose shall be such as to measure no more than one and one-half (1½) inches in any direction, and shall be absolutely free from dust, dirt, or earthy particles. All concrete must be mixed and placed in position within the time required for the setting of the cement, in such manner that the maximum strength of the cement shall be secured in the work, otherwise it will be removed and replaced at the expense of the contractor, until this object shall be attained. Concrete will be placed in uniform layers not exceeding six (6) inches in thickness, and will be carefully rammed or rolled to the satisfaction of the United States engineer.

Miscellaneous.

General requirements.—The entire work must be completed on or before June 30, 1885. All work and workmanship must be the best of its kind, satisfactory in every respect to the United States engineer; and likewise to his satisfaction all operations must be carried on with the utmost vigor, with ample force, and all necessary machinery and plant, of kinds best adapted to the purpose, and required to insure the greatest possible progress in the prosecution of the work. The right is especially reserved to the United States engineer to direct the employment of additional workmen and the use of additional or better machinery when, in his opinion, this course is necessary to the accomplishment of the purposes above stated. The contractor will be responsible for the orderly behavior of his working force, and will be required to discharge, and keep his force free of, all disorderly or insubordinate employees. Failure on the part of the contractor to comply with any of the requirements contained in this paragraph will be authority for the United States to annul the contract and proceed with the work in such manner as may be deemed necessary for its most speedy and economical completion, and to withhold from the contractor all retained percentages and other moneys that may be due or become due.

Payments will be made monthly on estimates prepared by inspectors and approved by the United States engineer, and ten (10) per centum of the amount due on each payment will be retained until the final completion and acceptance of the work. The first payment will not be made until the work shall have been carried on in a manner satisfactory to the United States engineer throughout one full calendar month, and the estimate for that payment will include all work accepted up to the last day of said month. Subsequent payments will be made as soon after the close of the month to which they relate as the estimates and accounts can be prepared, generally by the 8th day of each month.

It is to be expressly understood that payments on account of the several items included in the proposal hereto attached will be in full for all work and material required to accomplish and complete everything required by these specifications.

The contractor must assume all risks incident to the work and to its preservation in all its parts, until final acceptance; he must construct and remove all necessary coffer-dams and other auxiliary structures; do all required pumping; remove ice, snow, and drift that may accumulate during the progress of the work, and in general do everything required for carrying on the work in a vigorous and workmanlike manner and for securing it against damage, by freshets or otherwise, during its progress.

On completion of the work and before final payment the contractor must remove all machinery, rubbish, and refuse material from the site of the work and from the land pertaining thereto.

To prevent dispute and litigation it is expressly stipulated that the decision of the United States engineer shall be final as to the true meaning and intent of these specifications and on all questions of measurement made under them; and further that the said engineer shall have the right—

1st. To correct any errors or omissions necessary to a proper fulfillment of the intent of these specifications.

2d. To modify them whenever, in his opinion, it may be necessary for the proper accomplishment of the object in view. Written notice of any modification will, in each case, be furnished the contractor, by the United States engineer, and no claim for extra allowance, on account of such modification, will be considered or allowed, unless presented in writing to the said engineer by the contractor, within forty-eight hours after receipt of the notice. The fair allowance, if any, to be made will be determined by the United States engineer.

3d. To order such extra work as may, in his opinion, be necessary, but the contractor is cautioned to do no such work until he shall have received a written order for the same from the United States engineer aforesaid, such order being absolutely essential to the consideration and allowance of any claim whatever for extra compensation; the fair compensation thereupon to be allowed will be determined by the United States engineer.

The following *approximate* estimate of quantities will be considered in computing the total of each bid as a basis of award; but no variations in these amounts arising from erroneous computations, or from changes made during the progress of the work, will be regarded as grounds for any claim against the United States, it being distinctly understood that the contractor is to do all that is necessary to accomplish the object in view (neither more nor less), as required by the United States engineer.

Approximate estimate of quantities.

Coping masonry	cubic yards..	1,125
Cut-stone masonry	do....	1,550
Concrete masonry	do....	2,000
Stone filling in cribs	cords..	450
Riprap backing	do....	475
Clay and gravel backing	cubic yards..	1,000
Pine timber and plank	feet, B. M..	175,000
Oak timber	do....	33,000
Wrought-iron bolts and cramps	pounds..	50,000
Spikes and nails	do....	2,500
Excavation	cubic yards..	1,800
Area to be cleared	square yards..	8,000

PROPOSAL.

———— ————,

————— ————, 1883.

Major G. J. LYDECKER,

Corps of Engineers, U. S. A., Washington, D. C.:

SIR: In accordance with your advertisement of August 29, 1883, inviting proposals for construction of dam for increasing the water supply of Washington, D. C., and subject to all the conditions and requirements thereof, and of your specifications of the same date, copies of both of which are hereto attached, and, so far as they relate to this proposal, are made a part of it, —— propose to furnish the materials and do the work at the following prices, viz:

Will furnish material for and place stone coping at ——— (——) dollars and ——— (——) cents per cubic yard.

If coping is furnished and dressed by the United States, will furnish the mortar, set and secure the stone in the work for ——— (——) dollars and ——— (——) cents per cubic yard.

Will furnish material for and place cut-stone masonry at ——— (——) dollars and ——— (——) cents per cubic yard.

Will furnish material for and place concrete masonry at ——— (——) dollars and ——— (——) cents per cubic yard.

Will furnish stone filling, properly leveled in cribs, at ——— (——) dollars and ——— (——) cents per cord of 128 cubic feet.

Will furnish and place stone for rip-rap backing at ——— (——) dollars and ——— (——) cents per cord of 128 cubic feet.

Will furnish and place backing of clay and gravel as required at ——— (——) dollars and ——— (——) cents per cubic yard.

Will furnish pine timber and plank framed and secured in the work at ——— (——) dollars and ——— (——) cents per thousand feet B. M.

Will furnish oak timber framed and secured in the work at ——— (——) dollars and ——— (——) cents per thousand feet B. M.

Will furnish wrought-iron drift-bolts and cramps secured in the work at ——— (——) cents per pound.

Will furnish all nails and spike in the work at ——— (——) cents per pound.

Will do all excavation at ——— (——) cents per cubic yard.

Will clear trees, drift, and all rubbish, for a width of one hundred (100) feet, more or less, along the line of the new masonry dam for ——— (——) cents per square yard of area cleared.

The stone that —— propose to furnish, as above, for coping and cut-stone masonry is to be obtained from ——— ———.

If permitted to take stone from the Seneca Quarry, claimed by the Government, —— will make the prices for masonry and stone work as follows:

For coping ——— (——) dollars and ——— (——) cents per cubic yard.

For cut-stone masonry ——— (——) dollars and ——— (——) cents per cubic yard.

For concrete masonry ——— (——) dollars and ——— (——) cents per cubic yard.

For stone filling ——— (——) dollars and ——— (——) cents per cubic yard.

For rip-rap backing ——— (——) dollars and ——— (——) cents per cubic yard.

—— make this proposal with a full knowledge of the kind, quantity, and quality of the materials and work required, and, if it is accepted, will, after receiving written notice of such acceptance, enter into contract within ten days, with good and sufficient sureties for the faithful performance thereof, and will commence active operations within —— days after the contracts are signed.

(Signature) ——— ———,
(Address) Town of ———,
County of ———,
State of ———.

In case of a firm add names of partners.
(Signed in triplicate.)

Bidder's bond.

Know all men by these presents that we,* ——— ———, of ———, as principal, and ——— ———, of ———, and ——— ———, of ———, as sureties, are held and bound unto the United States of America, in the penal sum of twenty thousand dollars ($20,000), to the payment of which sum, well and truly to be made, we do bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents.

Given under our hands and seals this ——— day of ———, 1883.

The condition of this obligation is such that whereas the above bounden* ——— ———, in response to a public advertisement and notice, dated August 29, 1883, and given and published by Major G. J. Lydecker, Corps of Engineers, United States Army, ha— made and presented to Major G. J. Lydecker, Corps of Engineers, United States Army, a formal proposal, in writing, whereby —he— ha— proposed and agreed to enter into a contract with Major G. J. Lydecker, Corps of Engineers, United States Army, for construction of dam for increasing the water supply of Washington, D. C., according to the terms and conditions set forth in said advertisement and notice.

Now, therefore, if the said* ——— ——— shall not withdraw† —— said proposal within sixty days from the date of opening the proposals, and shall within ten days from the date on which —— may be notified that —— said proposal has been accepted, and the said contract awarded to —— (provide such award be made within the sixty

* Insert full name of each bidder or partner.
† Fill remaining blanks with the words "he," "his," or "him," "they," "their," or "them," as the sense demands.

days above mentioned), duly and formally enter into such contract agreeably to the terms of —— said proposal, and into such bond for its due performance as shall be required of ——, or if —— said proposal shall not be accepted and such contract not be awarded —— then this obligation shall be void; otherwise, that is to say, if either —— shall withdraw —— proposal within said sixty days, or fail to enter within said ten days into such contract if awarded —— and into such bond, to remain in full force, effect, and virtue.

Witnesses:

—— ——. —— ——.*
—— ——. —— ——.*
—— ——. —— ——.*

(Executed in triplicate).

Justification of the sureties.

STATE OF ——,
County of ——, *ss:*

I, —— ——, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of —— thousand dollars ($——) over and above all my debts and liabilities.

(Signature of surety) —— ——.

Before me.
(Signature of officer administering oath, with seal, if any) —— ——

STATE OF ——,
County of ——, *ss:*

I, —— ——, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of —— thousand dollars ($——) over and above all my debts and liabilities.

(Signature of surety) —— ——.

Before me.
(Signature of officer administering oath, with seal, if any) —— ——.

Certificate.

I, —— ——, do hereby certify that —— —— and —— ——, the sureties above named, are personally known to me, and that, to the best of my knowledge and belief, each is pecuniarily worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

(Signature of certifying official) —— ——.

NOTE.—The certificate may be given separately as to each surety, and modified accordingly.

[FORM 19a.]

Articles of agreement entered into this 7th day of November, eighteen hundred and eighty-three (1883), between Major G. J. Lydecker, Corps of Engineers, U. S. Army, of the first part, and Samuel H. Chittenden and George B. Chittenden, partners, doing business under the firm name of Chittenden Brothers, of Washington, of the District of Columbia, of the second part:

This agreement witnesseth that, in conformity with the advertisement and specifications hereunto attached, and which form a part of this contract, the said Major G. J. Lydecker, Corps of Engineers, for and in behalf of the United States of America, and the said Chittenden Brothers for themselves, their heirs, executors, and administrators, have mutually agreed, and by these presents do mutually covenant and agree, to and with each other, as follows:

That the said party of the second part shall furnish Seneca stone from the Government quarry above the Great Falls of the Potomac River, all other material, and do all the work required for *construction of dam* for increasing the water supply of Washington, D. C. In consideration of the material being furnished and work done, as provided for above, the said party of the first part shall pay to the said party of the second part, as follows:

For coping masonry, twenty-four ($24) dollars and fifty (50) cents per cubic yard. For cut-stone masonry, twenty (20) dollars and seventy-five (75) cents per cubic yard. For concrete masonry, five (5) dollars and fifty (50) cents per cubic yard. For stone filling in cribs, six (6) dollars and fifty (50) cents per cord of 128 cubic feet. For rip-

† Add seal of wax or wafer.

rap backing, seven (7) dollars and twenty-five (25) cents per cord of 128 cubic feet. For clay and gravel backing, one (1) dollar per cubic yard. For pine timber and plank in the work, forty-five (45) dollars per thousand feet B. M. For oak timber in the work, seventy-five (75) dollars per thousand feet B. M. For wrought-iron drift-bolts and cramps in the work, seven (7) cents per pound. For nails and spikes in the work, six (6) cents per pound. For excavation, one (1) dollar per cubic yard. For cleaning area, five (5) cents per square yard. It is further covenanted and agreed that, if in the opinion of the party of the first part, the stone obtained from the Seneca quarry does not prove suitable for coping, then the party of the second part shall furnish and place in lieu thereof a coping of granite, as required by the party of the first part, for which the price to be paid to the party of the second part shall be at the rate of thirty-two (32) dollars per cubic yard. It is also covenanted and agreed that, if the stone for coping is furnished and dressed by the party of the first part, the party of the second part shall place it in the work, and for coping so placed he shall be paid at the rate of seven (7) dollars and fifty (50) cents per cubic yard.

All materials furnished and work done under this contract shall, before being accepted, be subject to a rigid inspection by an inspector appointed on the part of the Government, and such as does not conform to the specifications set forth in this contract shall be rejected. The decision of the engineer officer in charge as to quality and quantity shall be final.

The said Chittenden Brothers shall commence the work on or before the fifteenth (15th) day of November, eighteen hundred and eighty-three (1883), and shall complete the same on or before the thirtieth (30th) day of June, eighteen hundred and eighty-five (1885).

If, in any event, the party of the second part shall delay or fail to commence with the delivery of the material, or the performance of the work on the day specified herein, or shall, in the judgment of the engineer in charge, fail to prosecute faithfully and diligently the work, in accordance with the specifications and requirements of this contract, then, in either case, the party of the first part, or his successor legally appointed, shall have power, with the sanction of the Chief of Engineers, to annul this contract by giving notice in writing to that effect to the party (or parties, or either of them) of the second part; and, upon the giving of such notice, all money or reserved percentage due or to become due to the party or parties of the second part, by reason of this contract shall be and become forfeited to the United States; and the party of the first part shall be thereupon authorized, if an immediate performance of the work or delivery of the materials be in his opinion required by the public exigency, to proceed to provide for the same by open purchase or contract, as prescribed in section 3709 of the Revised Statutes of the United States: *Provided, however*, that if the party (or parties) of the second part shall, by freshets, ice, or other force or violence of the elements, and by no fault of his or their own, be prevented either from commencing or completing the work, or delivering the materials at the time agreed upon in this contract, such additional time may, in writing, be allowed him or them for such commencement or completion as, in the judgment of the party of the first part, or his successor, shall be just and reasonable; but such allowance and extension shall in no manner affect the rights or obligations of the parties under this contract, but the same shall subsist, take effect, and be enforceable precisely as if the new date for such commencement or completion had been the date originally herein agreed upon.

If, at any time during the prosecution of the work, it be found advantageous or necessary to make any change or modification in the project, and this change or modification should involve such change in the specifications as to character and quantity, whether of labor or material, as would either increase or diminish the cost of the work, then such change or modification must be agreed upon in writing by the contracting parties, the agreement setting forth fully the reasons for such change, and giving clearly the quantities and prices of both material and labor thus substituted for those named in the original contract, and before taking effect must be approved by the Secretary of War: *Provided*, that no payments shall be made unless such supplemental or modified agreement was signed and approved before the obligation arising from such modification was incurred.

No claim whatever shall at any time be made upon the United States by the party or parties of the second part, for or on account of any extra work or material performed or furnished, or alleged to have been performed or furnished under, or by virtue of this contract, and not expressly bargained for and specifically included therein, unless such extra work or materials shall have been expressly required in writing by the party of the first part, or his successor, the prices and quantities thereof having been first agreed upon by the contracting parties and approved by the Chief of Engineers.

The party of the second part shall be responsible for and pay all liabilities incurred in the prosecution of the work for labor and material.

Payments shall be made to the said Chittenden Brothers as provided for in the specifications hereto attached.

Neither this contract nor any interest therein shall be transferred by the said Chittenden Brothers to any other party; and any such transfer shall cause the annulment of the contract so far as the United States are concerned. All rights of action, however, to recover for any breach of this contract by the said Chittenden Brothers are reserved to the United States.

No member of or delegate to Congress, nor any person belonging to or employed in the military service of the United States, is or shall be admitted to any share or part of this contract, or to any benefit which may arise herefrom.*

This contract shall be subject to approval of the Chief of Engineers, U. S. A.

In witness whereof the undersigned have hereunto placed their hands and seals the date first hereinbefore written.

G. J. LYDECKER, [SEAL.]
Maj. Eng. U. S. A.
CHITTENDEN BROTHERS. [SEAL.]

Witnesses:
SIMON NEWTON.
JOHN M. LASKEY.

(Executed in quintuplicate.)
Approved November 9, 1883.

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

† I do solemnly swear that the foregoing is an exact copy of a contract made by me personally with ——— ———; that I made the same fairly, without any benefit or advantage to myself, or allowing any such benefit or advantage corruptly to the said ——— ——— or any other person; and that the papers accompanying include all those relating to the said contract as required by the statute in such case made and provided.

———, ——— *of Engineers.*

Subscribed and sworn to before me this —— day of ———.

——— ———
——— ———.

NOTE.—The copy of contract for the Bureau must be accompanied with an abstract of the bids and copy of each bid and advertisement, unless previously furnished.—*See* G. O. No. 72, A. G. O. of 1872. Par. XII, p. 3.

[Committee No. 83.]

Supplemental articles of agreement between Major Lydecker and Chittenden Bros. for construction of dam.

Supplemental articles of agreement entered into this 4th of March, eighteen hundred and eighty-four (1884), between Maj. G. J. Lydecker, Corps of Engineers, U. S. Army, of the first part, and Samuel H. Chittenden and George B. Chittenden, partners, doing business under the firm-name of Chittenden Brothers, of Washington, of the District of Columbia, of the second part.

Whereas on the 7th of November, 1883, the parties above mentioned entered into a contract for the construction of a dam above the Great Falls of the Potomac River for increasing the water supply of Washington, D. C., which contract was duly approved by the Chief of Engineers on the 9th day of November, 1883, whereby the parties of the second part agreed, among other things, for a stated consideration, to build a dam about four hundred and fifty (450) feet long across the Virginia channel of the Potomac River, said dam consisting essentially of a substructure of crib-work filled with stone, a superstructure of cut-stone masonry, with a puddle and riprap backing.

And whereas in the prosecution of the work it is found advantageous and desirable to make a change in the character of the work by substituting for the crib-dam

* NOTE.—Here add to any contract made with an incorporated company for its general benefit the following words, viz: "But this stipulation, so far as it relates to members of or delegates to Congress, is not to be construed to extend to this contract."—*See* Sec. 3740 Revised Statutes.

† NOTE.—This affidavit is required only on the quintuplicate copy of contract intended for the returns office, Department of the Interior.

aforesaid across the Virginia Channel, a solid masonry dam similar in its details to the masonry dam described in the specifications forming part of the contract above mentioned: Therefore,

This agreement witnesseth that the said Major G. J. Lydecker, Corps of Engineers, for and in behalf of the United States of America, and the said Chittenden Brothers, for themselves, their heirs, executors, and administrators, have mutually agreed and by these presents do mutually covenant and agree to and with each other as follows:

That the said party of the second part shall furnish all rip-rap stone, lumber, brush, puddling, iron, and all other materials required for and construct all deflecting dams, coffer-dams, sluices, and all other auxiliary works and do all pumping and all other labor required to turn the water from the site of the work in the Virginia Channel, and shall furnish Seneca stone from the Government quarry above the Great Falls of the Potomac River, all other material, and do all the work required for the construction of a masonry dam across the Virginia Channel similar in its details to the masonry dam described in the specifications which form part of the contract of which this agreement is a modification, and drawings of which are on file in the office of the Washington Aqueduct.

In consideration of the material being furnished and work done as provided for above, the said party of the first part shall pay to the said party of the second part the same prices for the material in the finished structure as agreed upon in the contract above mentioned, to wit:

For coping masonry, twenty-four (24) dollars and fifty (50) cents per cubic yard. For cut-stone masonry, twenty (20) dollars and seventy-five (75) cents per cubic yard. For concrete masonry, five (5) dollars and fifty (50) cents per cubic yard. For riprap backing, seven (7) dollars and twenty-five (25) cents per cord of 128 cubic feet. For wrought-iron drift-bolts and cramps, seven (7) cents per pound. For excavation, one (1) dollar per cubic yard. And also in consideration of the increased expense and labor incident to the change, for making the deflecting dams, coffer-dams, sluices, and all other auxiliary works required and removing the same upon the completion of the work, doing all pumping and other labor required, and taking all risks incidental to the prosecution of the work, the sum of fifteen thousand (15,000) dollars over and above the prices paid for the materials in the completed structure.

And it is further provided that as the work progresses payments on this fifteen thousand (15,000) dollars shall be made to the party of the second part from month to month, according as may be deemed just and proper by the U. S. engineer in charge of the work.

And it is further agreed that all the provisions and obligations of the contract entered into on the 7th day of November, 1883, between the parties before named, which are deemed by the engineer in charge of the work to be applicable, shall extend over this supplemental contract and agreement.

And it is further agreed by the parties of the second part that they will not make or cause to be made any claim upon the Government of the United States in consequence of the change of plan of the dam, and in furtherance of which this agreement is made.

It is further provided that this agreement is to become operative only when approved by the Chief of Engineers and the Secretary of War, as prescribed in G. O. No. 40, Headquarters of the Army, A. G. O., May 22, 1880.

It is further stated in explanation of the desirability of this modification to the contract above mentioned that the specifications for the dam given in the contract were drawn up from erroneous information derived from old surveys, which led to the opinion that, with the funds available, it would be impossible to construct a masonry dam throughout. Subsequent and more detailed and accurate surveys and careful studies have demonstrated the practicability of making the dam entirely of masonry, at a cost exceeding that contemplated in the specifications by only eighty-five hundred (8,500) dollars, and thus replacing the perishable crib-dam by a structure practically everlasting. Owing to the uncertain nature of the work of turning and keeping the water from the site of the dam, which can only be found out as the work progresses, and may necessitate a change at any time, it is impossible to make out a bill of particulars as to the extra cost involved. The most careful consideration has been given to the subject, and fifteen thousand (15,000) dollars fixed upon as a fair remuneration.

Witnesses:
SIMON NEWTON.
Witnesses:
CHAS. P. CALVERT.

G. J. LYDECKER,
Major of Engineers, U. S. A.
CHITTENDEN BROTHERS.

The undersigned, Levi P. Wright, Henry P. Gilbert, Walter Paris, Horace S. Cummings, and John W. Powell, sureties for Chittenden Brothers, do state, and by their signatures below, do agree to be bounden in every respect, and to bind their heirs,

Payments shall be made to the said Chittenden Br[illegible]nce to this modifica-
specifications hereto attached. nce to the original con-
Neither this contract nor any interest therein shal[illegible]
tenden Brothers to any other party; and any such [illegible]
of the contract so far as the United States are cor[illegible]
ever, to recover for any breach of this contract [illegible]
reserved to the United States.
No member of or delegate to Congress, no[illegible]
in the military service of the United St[illegible]
or part of this contract, or to any benefit
This contract shall be subject to appr[illegible]
In witness whereof the undersigned
date first hereinbefore written.

HORACE S. CUMMINGS.
LEVI P. WRIGHT,
HENRY P. GILBERT,
WALTER PARIS,

ROBERT T. LINCOLN,
Secretary of War.

Witnesses:
SIMON NEWTON.
JOHN M. LASKEY.

(Executed in quintup[illegible]
Approved November

† I do solemn[illegible]
personally wi[illegible]
vantage to [illegible]

those rel[illegible]
provide[illegible]

S[illegible]

[Committee No. 84.]

War inclosing letter of Chief of Engineers.

WAR DEPARTMENT,
Washington City, November 20, 1888.

SIR: I acknowledge the receipt of your letter of the 30th ultimo with copies of all papers in this Department relative to water supply to the city of Washington from the present reser-

I inclose a letter of the 15th instant from the Chief of Engineers, on the subject referred to in addition to the papers transmitted, [illegible] letter of the 29th ultimo, to Hon. J. C. Clements, of your com-

Very respectfully,

WM. C. ENDICOTT,
Secretary of War.

Hon. G. F. EDMUNDS,
Chairman Joint Select Committee on Washington Aqueduct Tunnel.

[Committee No. 85.]

Chief Engineer transmits additional papers.

OFFICE OF CHIEF OF ENGINEERS, UNITED STATES ARMY,
Washington, D. C., November 15, 1888.

Hon. WM. C. ENDICOTT,
Secretary of War.

SIR: In compliance with the letter of Hon. G. F. Edmunds, U. S. Senate, Chairman Joint Committee on Washington Aqueduct Tunnel, &c., dated October 30, 1888, and referred to this office for report, I have the honor to transmit herewith, in addition to the papers transmitted with my letter of October 27, 1888, the following papers, viz:

Under paragraph 1. List of printed documents on the subject of Washington Aqueduct, as far as known to this office, marked "B," exclusive of annual reports of Chief of Engineers, mentioned hereinafter.

Under paragraph 2. Copies of orders assigning Major G. J. Lydecker, Capt. T. W. Symons, and Lieut. C. McD. Townsend, Corps of Engineers, to duty in connection with the Washington Aqueduct. Marked C^1, C^2, C^3. (In this connection, see also A^1.)

Under paragraph 3. The name and address of each officer, &c., &c., marked A, A^1, A^2, A^3, A^4, A^5, and A^6.

Under paragraph 4. Report of Major G. J. Lydecker, Corps of Engineers, relative to employment and selection of assistant engineers, inspectors, &c. Marked D.

Under paragraph 5. Copies of abstract of proposals for furnishing cast-iron water-pipe together with six proposals and Major Lydecker's letter of transmittal marked E, E^1, E^2, E^3, E^4, E^5, E^6, and E^7.

Copy of articles of agreement dated September 20, 1883, with West Point Foundry Association for furnishing cast-iron water-pipe. Marked F.

Copy of articles of agreement, dated September 20, 1883, with A. H. McNeal, for same and special castings. Marked G.

Copies of abstract of proposals for constructing reservoir, with fifteen copies of proposals and Major Lydecker's letter of transmittal, marked H, H^1, H^2, H^3, H^4, H^5, H^6, H^7, H^8, H^9, H^{10}, H^{11}, H^{12}, H^{13}, H^{14}, H^{15}, and H^{16}.

of agreement, dated October 30, 1883, with Maloney & Gleason for
voir, marked I.
ary articles of agreement with same, dated July 20, 1887,

posals for constructing dam, with copies of eight propo-
er of transmittal, marked K, K,[1] K,[2] K,[3] K,[4] K,[5] K,[6] K,[7]

ted November 7, 1883, with Chittenden Brothers,

agreement with same, dated March 4, 1884,

paragraphs 1 and 2 are being copied, and will be
an be prepared.
obedient servant,

THOS. LINCOLN CASEY,
Brig. Gen., Chief of Engineers.

[Committee No. 86.]

eneral Casey, inclosing a list of inspectors and subinspectors.

OFFICE OF THE CHIEF OF ENGINEERS, UNITED STATES ARMY,
Washington, D. C., November 20, 1888.

GE F. EDMUNDS,
. *S. Senate, Chairman Joint Committee,*
Washington Aqueduct Tunnel, &c., Washington, D. C.

SIR: In compliance with your letter of this date I have the honor to transmit herewith a list of the inspectors and subinspectors who have been employed on the Washington Aqueduct Tunnel, together with their addresses, as far as known. It will be noted that but two are now in the service of the United States, viz, Inspector Elias H. Kirlin and Subinspector Charles E. Thomas. The address of Capt. Richard L. Hoxie, Corps of Engineers, is Montgomery, Ala., and that of Capt. T. W. Symons, Corps of Engineers, is 1727 De Sales street, Washington, D. C.

In this connection, I would state that this last information was given in my letter of November 15, 1888, to the Secretary of War, transmitting a certain portion of the information and papers called for by your letter of October 27, 1888, to the Secretary of War.

Very respectfully, your obedient servant,

THOS. LINCOLN CASEY,
Brig. Gen., Chief of Engineers.

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*Inspectors and subinspectors.**

	Name.	Employment.	Address.
Inspector	C. B. Tarbell	Out of service	Unknown.
	George W. S. White	do	Dead.
	John L. Brenizer	do	Unknown.
	H. M. Woodward	do	Do.
	Thomas Lucas	do	2151 Penn. Ave. N. W.
	Henry C. Chadwell	do	2117 H St. N. W.
	Samuel A. Harper	do	Unknown.
	Elias H. Kirlin	In service	1203 W St. N. W.
Subinspector	Frank C. Hutton	Out of service	Unknown.
	Lorenzo A. Lucas	do	Do.
	John W. Beale	do	Do.
	Samuel E. Boyce	do	Do.
	James Lanigan	do	Do.
	Jacob B. Masters	do	Do.
	Nicholas Harper	do	Do.
	Martin McNamara	do	1916 7th St. N. W.
	Oscar H. Briggs	do	3300 M St. N. W.
	Thomas O Brien	do	Cor. 5th and Lincoln Sts. N. W.
	George T. Woodward, jr	do	Unknown.
	John P. Rowzee	do	3300 M St. N. W.
	Charles E. Thomas	In service.	507 6th St. N. W.
	George W. Perkins	Out of service	Unknown.
	Edmond E. Fisher	do	Great Falls, Md.
	John H. Florin	do	3062 M St. N. W.
	Thomas Muntz	do	Unknown.
	Henry S. Kirwan	do	1008 H St. N. W.
	Andrew J. Beall	do	3233 M St. N. W.
	Patrick J. Malone	do	18th St. and Boundary N. W.
	James S. Leasure	do	1235 Congress St. N. W.

* Who are or have been employed on the Washington Aqueduct Tunnel, with addresses as far as known when last heard from.

executors, and administrators, jointly and severally, in reference to this modification of the original contract mentioned herein, as in reference to the original contract itself.

Witnesses:

J. W. BECKER.
J. W. BECKER.
J. N. BREWER.
J. W. BECKER.

HORACE S. CUMMINGS.
LEVI P. WRIGHT,
HENRY P. GILBERT,
WALTER PARIS,

Approved.

ROBERT T. LINCOLN,
Secretary of War.

WAR DEPT., *April* 4, 1884.

[Committee No. 84.]

Letter of Secretary of War inclosing letter of Chief of Engineers.

WAR DEPARTMENT,
Washington City, November 20, 1888.

SIR: I have the honor to acknowledge the receipt of your letter of the 30th ultimo requesting to be furnished with copies of all papers in this Department relative to the extension of the water supply to the city of Washington from the present reservoir to any new one.

In reply I beg to inclose a letter of the 15th instant from the Chief of Engineers, with copies of papers on the subject referred to in addition to the papers transmitted, with Department letter of the 29th ultimo, to Hon. J. C. Clements, of your committee.

Very respectfully,

WM. C. ENDICOTT,
Secretary of War.

Hon. G. F. EDMUNDS,
Chm. Joint Select Committee on Washington Aqueduct Tunnel.

[Committee No. 85.]

Chief Engineer transmits additional papers.

OFFICE OF CHIEF OF ENGINEERS, UNITED STATES ARMY,
Washington, D. C., November 15, 1888.

Hon. WM. C. ENDICOTT,
Secretary of War.

SIR: In compliance with the letter of Hon. G. F. Edmunds, U. S. Senate, Chairman Joint Committee on Washington Aqueduct Tunnel, &c., dated October 30, 1888, and referred to this office for report, I have the honor to transmit herewith, in addition to the papers transmitted with my letter of October 27, 1888, the following papers, viz:

Under paragraph 1. List of printed documents on the subject of Washington Aqueduct, as far as known to this office, marked "B," exclusive of annual reports of Chief of Engineers, mentioned hereinafter.

Under paragraph 2. Copies of orders assigning Major G. J. Lydecker, Capt. T. W. Symons, and Lieut. C. McD. Townsend, Corps of Engineers, to duty in connection with the Washington Aqueduct. Marked C^1, C^2, C^3. (In this connection, see also A^1.)

Under paragraph 3. The name and address of each officer, &c., &c., marked A, A^1, A^2, A^3, A^4, A^5, and A^6.

Under paragraph 4. Report of Major G. J. Lydecker, Corps of Engineers, relative to employment and selection of assistant engineers, inspectors, &c. Marked D.

Under paragraph 5. Copies of abstract of proposals for furnishing cast-iron water-pipe together with six proposals and Major Lydecker's letter of transmittal marked E, E^1, E^2, E^3, E^4, E^5, E^6, and E^7.

Copy of articles of agreement dated September 20, 1883, with West Point Foundry Association for furnishing cast-iron water-pipe. Marked F.

Copy of articles of agreement, dated September 20, 1883, with A. H. McNeal, for same and special castings. Marked G.

Copies of abstract of proposals for constructing reservoir, with fifteen copies of proposals and Major Lydecker's letter of transmittal, marked H, H^1, H^2, H^3, H^4, H^5, H^6, H^7, H^8, H^9, H^{10}, H^{11}, H^{12}, H^{13}, H^{14}, H^{15}, and H^{16}.

Copy of articles of agreement, dated October 30, 1883, with Maloney & Gleason for construction of reservoir, marked I.

Copy of supplementary articles of agreement with same, dated July 20, 1887, marked J.

Copies of abstracts of proposals for constructing dam, with copies of eight proposals and Major Lydecker's letter of transmittal, marked K, K,[1] K,[2] K,[3] K,[4] K,[5] K,[6] K,[7] K,[8] and K.[9]

Copy of articles of agreement, dated November 7, 1883, with Chittenden Brothers, for construction of dam, marked L.

Copy of supplementary articles of agreement with same, dated March 4, 1884, marked M.

Quite a number of papers under paragraphs 1 and 2 are being copied, and will be submitted just as soon as they can be prepared.

Very respectfully, your obedient servant,

THOS. LINCOLN CASEY,
Brig. Gen., Chief of Engineers.

[Committee No. 86.]

Letter of General Casey, inclosing a list of inspectors and subinspectors.

OFFICE OF THE CHIEF OF ENGINEERS, UNITED STATES ARMY,
Washington, D. C., November 20, 1888.

HON. GEORGE F. EDMUNDS,
U. S. Senate, Chairman Joint Committee,
Washington Aqueduct Tunnel, &c., Washington, D. C.

SIR: In compliance with your letter of this date I have the honor to transmit herewith a list of the inspectors and subinspectors who have been employed on the Washington Aqueduct Tunnel, together with their addresses, as far as known. It will be noted that but two are now in the service of the United States, viz, Inspector Elias H. Kirlin and Subinspector Charles E. Thomas. The address of Capt. Richard L. Hoxie, Corps of Engineers, is Montgomery, Ala., and that of Capt. T. W. Symons, Corps of Engineers, is 1727 De Sales street, Washington, D. C.

In this connection, I would state that this last information was given in my letter of November 15, 1888, to the Secretary of War, transmitting a certain portion of the information and papers called for by your letter of October 27, 1888, to the Secretary of War.

Very respectfully, your obedient servant,

THOS. LINCOLN CASEY,
Brig. Gen., Chief of Engineers.

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*Inspectors and subinspectors.**

	Name.	Employment.	Address.
Inspector	C. B. Tarbell	Out of service	Unknown.
	George W. S. White	do	Dead.
	John L. Brenizer	do	Unknown.
	H. M. Woodward	do	Do.
	Thomas Lucas	do	2151 Penn. Ave. N. W.
	Henry C. Chadwell	do	2117 H St. N. W.
	Samuel A. Harper	do	Unknown.
	Elias H. Kirlin	In service	1203 W St. N. W.
Subinspector	Frank C. Hutton	Out of service	Unknown.
	Lorenzo A. Lucas	do	Do.
	John W. Beale	do	Do.
	Samuel E. Boyce	do	Do.
	James Lanigan	do	Do.
	Jacob B. Masters	do	Do.
	Nicholas Harper	do	Do.
	Martin McNamara	do	1916 7th St. N. W.
	Oscar H. Briggs	do	3306 M St. N. W.
	Thomas O'Brien	do	Cor. 5th and Lincoln Sts. N. W.
	George T. Woodward, jr	do	Unknown.
	John P. Rowzee	do	3300 M St. N. W.
	Charles E. Thomas	In service	507 6th St. N. W.
	George W. Perkins	Out of service	Unknown.
	Edmond E. Fisher	do	Great Falls, Md.
	John H. Florin	do	3062 M St. N. W.
	Thomas Muntz	do	Unknown.
	Henry S. Kirwan	do	1008 H St. N. W.
	Andrew J. Beall	do	3233 M St. N. W.
	Patrick J. Malone	do	18th St. and Boundary N.W.
	James S. Leasure	do	1235 Congress St. N. W.

* Who are or have been employed on the Washington Aqueduct Tunnel, with addresses as far as known when last heard from.

[Committee No. 87.]

Letter of Secretary of War, inclosing letter of Chief of Engineers.

WAR DEPARTMENT,
Washington City, November 22, 1888.

SIR: In further compliance with your request of the 30th ultimo, for copies of all papers in this Department relative to the extension of the water supply to the city of Washington from the present reservoir to any new one, I have the honor to inclose a letter of the 21st instant from the Chief of Engineers, with copies of papers on the subject referred to, in addition to the papers transmitted with Department letter of the 16th instant.

Very respectfully,

WM. C. ENDICOTT,
Secretary of War.

Hon. GEORGE F. EDMUNDS,
Chm. Joint Select Committee on Washington Aqueduct Tunnel.

[Committee No. 88.]

Letter of Chief of Engineers transmitting additional papers.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., November 21, 1888.

Hon. WILLIAM C. ENDICOTT,
Secretary of War:

SIR: In further compliance with the letter dated October 30, 1888, from Hon. George F. Edmunds, U. S. Senate, chairman of the joint committee on the Washington Aqueduct Tunnel, &c., and in addition to the papers transmitted with my letter of the 15th instant, I have the honor to transmit herewith the following papers, viz:

Copy of letter to the Secretary of War, October 12, 1882, provisionally approving project of Major Lydecker for increasing water supply, &c. $\frac{3338}{\text{R. \& H.}}$ 1882. Marked N.

Copy of Major Lydecker's project of October 8, 1882, for increasing water supply, &c. $\frac{3187}{\text{R. \& H.}}$ 1882. Marked O.

Copy of indorsements of Chief of Engineers and the Secretary of War on Major Lydecker's letter of July 14, 1883, on projcet for increasing water supply. $\frac{2096}{\text{R. \& H.}}$ 1883. Marked P.

Copy of letter of Aug. 7, 1883, Major Lydecker to the Chief of Engineers; application to publish advertisement, &c. $\frac{2309}{\text{R. \& H.}}$ 1883. Marked Q.

Copy of letter of Aug. 11, 1883, the Chief of Engineers to Major Lydecker, stating action on last-named paper. $\frac{2309}{\text{R. \& H.}}$ 1883. Marked Q^1.

Copy of letter of Sept. 18, 1883, the Chief of Engineers to Major Lydecker, approving award of contract for iron pipe, &c., to A. H. McNeal. $\frac{2567}{\text{R. \& H.}}$ 1883. Marked R.

Copy of letter of Oct. 16, 1883, the Chief of Engineers to Major Lydecker, approving contract with West Point Foundry for iron pipe. $\frac{2805 \text{ \& } 2909}{\text{R. \& H.}}$ 1883. Marked S.

Copy of letter of Oct. 23, 1883, the Chief of Engineers to Major Lydecker, approving rejection of Dewees & Co.'s bid for construction of dam. $\frac{2908}{\text{R. \& H.}}$ 1883. Marked T.

Copy of letter of Oct. 30, 1883, J. H. Dewees & Co. to the Secretary of War, protesting award of contract for tunnel to Beckwith and Quackenbush. $\frac{3047}{\text{R. \& H.}}$ 1883. Marked U.

Copy of letter of Nov. 2, 1883, the Secretary of War to Dewees & Co., in answer to above. $\frac{3047}{\text{R. \& H.}}$ 1883. Marked U^1.

Copy of letter of Nov. 5, 1883, the Chief of Engineers to Major Lydecker, approving contract with Maloney and Gleason for reservoir. $\frac{3030}{\text{R. \& H.}}$ 1883. Marked V.

Copy of letter of Nov. 9, 1883, the Chief of Engineers to Major Lydecker, approving contract with Chittenden Brothers for dam. $\frac{3062}{\text{R. \& H.}}$ 1883. Marked W.

Copy of letter of Dec. 7, 1883, Major Lydecker to the Chief of Engineers, requesting authority to lay iron pipe by day's labor, &c. $\frac{3343}{\text{R. \& H.}}$ 1883. Marked X.

Copy of letter of Dec. 10, 1883, the Chief of Engineers to Major Lydecker, granting authority requested above. $\frac{3343}{\text{R. \& H.}}$ 1883. Marked X[1].

Copy of letter of Feb. 27, 1884, Major Lydecker to the Chief of Engineers, recommending modification of plan for building dam. $\frac{617}{\text{R. \& H.}}$ 1884. Marked Y.

Copy of letter of March 27, 1884, Major Lydecker to the Chief of Engineers, transmitting supplementary contract with Chittenden Brothers for dam. $\frac{953}{\text{R. \& H.}}$ 1884. Marked Z.

Copy of letter of March 5, 1884, Major Lydecker to the Chief of Engineers, transmitting cross-section of the proposed dam. $\frac{655}{\text{R. \& H.}}$ 1884. Marked A A.

Copy of said cross-section. Marked A A[1].

Copy of letter of April 1, 1884, Maloney and Gleason to Major Lydecker, asking to transfer their contract to Gilbert Peterson. $\frac{1027}{\text{R. \& H.}}$ 1884. Marked B B.

Copy of letter of April 1, 1884, G. Peterson specifies plant he will put into work. $\frac{1027}{\text{R. \& H.}}$ 1884. Marked B B[2].

Copy of letter of Jan. 17, 1885, Major Lydecker to the Chief of Engineers, transmitting certain correspondence *in re* new reservoir. $\frac{273}{\text{R. \& H.}}$ 1885. Marked C C.

Copy of said correspondence. Marked C C[2].

Copy of letter of June 29, 1885, Major Lydecker to the Chief of Engineers, transmitting copies of applications of contractors for extension of time in dam, tunnel, and reservoir. $\frac{2053}{\text{R. \& H.}}$ 1885. Marked D D.

Copy of letter of July 3, 1885, the Chief of Engineers to the Secretary of War, transmitting above. $\frac{1515}{\text{G. R.'s}}$ 1885. Marked D D[1].

Copy of letter of July 24, 1885, Colonel Casey to the Chief of Engineers. Indorsement on report of Board of Engineers on modification of plan for new reservoir. $\frac{2264}{\text{R. \& H.}}$ 1885. Marked E E.

Copy of said report. Marked E E[1].

Copy of letter of July 15, 1885, the Chief of Engineers to Colonel Casey, relative to above report. Marked E E[2].

Copy of letter of Aug. 4, 1885, Major Lydecker to the Chief of Engineers, requesting that work under modified plan for new reservoir be proceeded with. $\frac{2368}{\text{R. \& H.}}$ 1885. Marked F F.

Copy of letter of Dec. 15, 1885, Major Lydecker to the Chief of Engineers, recommending calling attention of Congress to need of additional appropriation for tunnel. $\frac{3331}{\text{R. \& H.}}$ 1885. Marked G G.

Copy of third indorsement of letter of March 22, 1886, Maloney and Gleason to the Secretary of War *in re* claim for extra work on reservoir. $\frac{900}{\text{G. R.'s}}$ 1886. Marked H H.

Copy of report of Major Lydecker on said claim. Marked H H[1].

Copy of letter of June 5, 1886, the Secretary of War to attorney, on above claim. Marked H H[2].

Copy of letter of April 6, 1886, Major Lydecker to the Chief of Engineers, submits project for expenditure of $5,000 on Washington Aqueduct. $\frac{822}{\text{R. \& H.}}$ 1886. Marked I I.

Copy of letter of April 2, 1886, chairman House Committee on Appropriations requests information as to appropriation, expenditures, employés, and laws, Washington Aqueduct and extension. $\frac{825}{\text{R. \& H.}}$ 1886. Marked J J.

Copy of Major Lydecker's report on above. Marked J J[1].

Copy of letter of April 7, 1886, the Secretary of War to the chairman of the House committee, transmitting above report. Marked JJ[2].

Copy of letter of April 5, 1886, the Chief of Engineers to Major Lydecker, calling for project for expenditure of funds to prevent flooding in tunnel. $\frac{778}{\text{R. \& H.}}$ 1886. Marked K K.

Copy of letter of May 18, 1886, Major Lydecker to the Chief of Engineers, requesting authority to employ an assistant engineer on reservoir at $175 a month. $\frac{180}{III}$ 1886. Marked LL.

Copy of letter of May 21, 1886, the Chief of Engineers to Major Lydecker, relating to above application. Marked L L¹.

Copy of letter of June 28, 1886, Maloney & Gleason to Major Lydecker, requesting extension of time for reservoir. $\frac{622}{IV.}$ 1886. Marked M M.

Copy of letter of July 7, 1886, the Chief of Engineers to Major Lydecker, announcing approval of above application for extension. Marked M M¹.

Copy of letter of Nov. 6, 1886, Major Lydecker to the Chief of Engineers, requesting authority to employ one supervising inspector of masonry in tunnel, at $175 a month. $\frac{2397}{III}$ 1886. Marked N N.

Copy of letter of Nov. 10, 1886, the Chief of Engineers to Major Lydecker, granting authority as above. Marked N N¹.

Copy of letter of Aug. 9, 1886, the Chief of Engineers to Major Lydecker, calling for project for expending money appropriated by act of Aug. 4, 1886. $\frac{821}{III}$ 1886. Marked O O.

Copy of letter of Aug. 9, 1886, the Chief of Engineers to the Secretary of War, recommends a board to consider certain matters in connection with tunnel and reservoir. $\frac{865}{III}$ 1886. Marked P P.

Copy of letter of Aug. 18, 1886, the Chief of Engineers to Major Lydecker *in re* extension of time to Beckwith and Quackenbush on tunnel. $\frac{608}{IV}$ 1886. Marked Q Q.

Copy of letter of Dec. 16, 1886, Maloney & Gleason to Major Lydecker for extension of time. $\frac{314}{IV}$ 1887. Marked R R.

Copy of letter of Jan. 22, 1887, the Chief of Engineers to Major Lydecker, granting extension of time as asked for above. Marked R R¹.

Copy of letter of Jan. 20, 1887, Major Lydecker to the Chief of Engineers, submitting estimates for completion of tunnel, etc. $\frac{324}{III}$ 1887. Marked S S.

Copy of letter of Jan. 27, 1887, the Chief of Engineers to the Secretary of War, transmitting above. Marked S S¹.

Copy of letter of March 15, 1887, Chittenden Brothers to the Secretary of War, *in re* their claim for extra material, etc. $\frac{1061}{IV}$ 1887. Marked T T.

Copy of Major Lydecker's report on above claim. Marked T T¹.

Copy of 1st and 2d indorsements on letter of May 26, 1887, Beckwith and Quackenbush to the Chief of Engineers, *in re* a certain tunnel section. $\frac{2156}{III}$ 1887. Marked U U.

Copy of Major Lydecker's report as above. Marked U U¹.

Copy of letter of June 9, 1887, Beckwith & Quackenbush to Major Lydecker, requesting extension of contract. $\frac{2386}{IV}$ 1887. Marked V V.

Copy of letter of June 29, 1887, Major Lydecker to the Chief of Engineers, recommending extension of time to Maloney and Gleason under certain conditions. $\frac{2385}{IV}$ 1887. Marked W W.

Copy of Maloney and Gleason's request for extension above. Marked W W¹.

Copy of letter of July 30, 1887, the Chief of Engineers to the Second Comptroller, transmitting supplementary contract with Maloney and Gleason. Marked W W².

Copy of indorsement on letter of Nov. 28, 1887, Beckwith and Quackenbush, submitting correspondence in reference to tunnel section. $\frac{4205}{IV}$ 1887. Marked X X.

Copy of report of Major Lydecker on the above. Marked X X¹.

Copy of letter of Oct. 17, 1887, Beckwith and Quackenbush to the Chief of Engineers, renewing application in the above matter. $\frac{3815}{IV}$—1887. Marked X X².

Copy of Exhibit A in above. Marked X X³.
" " " B " " " X X⁴.
" " " C " " " X X⁵.
" " " D " " " X X⁶.

Copy of letter of Major Lydecker to the Chief of Engineers relative to above. Marked X X⁷.

Copy of letter of Oct. 31, 1887, Thayer, attorney for Chittenden Brothers, to the Secretary of War, *in re* their claim for cement, &c. $\frac{3895}{IV}$ 1887. Marked Y Y.

Copy of Major Lydecker's report on above. Marked Y Y¹.

Copy of letter of November 21, 1887, the Secretary of War to Thayer, attorney in above case. Marked Y Y².

Copy of letter and indorsements *in re* supplemental contract with Beckwith and Quackenbush for tunnel. $\frac{4326}{IV}$ 1887. Marked Z Z.

Copy of third indorsement *in re* application of Beckwith and Quackenbush for extension of contract, etc. $\frac{4205}{IV}$ 1887. Marked Z Z¹.

Copy of indorsements on letter of February 1, 1888, House Committee on Appropriations, *in re* H. R. 6437, as to certain deficiences. $\frac{526}{B}$ 1888. Marked A b.

Copy of letter of February 15, 1888, Major Lydecker to the Chief of Engineers, reports on provisions of H. R. No. 6437, 50th Congress, 1st session, as to tunnel. $\frac{5260}{B}$ 1888. Marked A c.

Copy of letter of April 14, 1888, Major Lydecker to the Chief of Engineers, recommends completing tunnel under present contract upon certain conditions named. $\frac{1316}{B}$ 1888. Marked A d.

Copy of tracing to accompany above. Marked A d¹.

Copy of tracing to accompany same. Marked A d².

Copy of letter, Major Lydecker to Chief of Engineers, relating to matters in above connection. Marked A d³.

Copy of memoranda relative to same. Marked Ad⁴.

Copy of letter of May 1, 1888, Maloney and Gleason to Major Lydecker. Claim for extra work. $\frac{1145}{C}$ 1888. Marked A e.

Copy of Major Lydecker's report on above. Marked A e¹.

Copy of indorsement of the Chief of Engineers on letter of Sept. 25, 1888, from the Chairman of the Senate Committee on the District of Columbia, referring to affidavits of Kendall Brothers and J. H. Lucas. $\frac{2831}{C}$ 1888. Marked A f.

Copy of letter of Oct. 2, 1888, Major Lydecker to the Chief of Engineers, calls attention to the impossibility of completing the Washington Aqueduct extension by Nov. 1, 1888, &c. $\frac{4023}{B}$ 1888. Marked A g.

Copy of Major Lydecker's report on decision of the First Comptroller in above. Marked A g¹.

Copy of letter of the First Comptroller, dated Oct. 10, 1888, giving decision on above. Marked A g².

Copy of third indorsement on Major Lydecker's report upon affidavits of Kendall Brothers and Thos. Lucas. Marked A h.

Copy of letter of Oct. 29, 1888, Major Lydecker to the Chief of Engineers, recommends extension of time for completing the aqueduct tunnel to Dec. 1, 1888. Marked A i.

Copy of correspondence between Major Lydecker and Beckwith & Quackenbush touching defective workmanship and material or failure to comply with contract. Marked A j.

Copy of correspondence between Major Lydecker and Beckwith and Quackenbush covering claims for extra compensation, &c. Marked A k.

List of papers in the office of the Chief of Engineers, copies of which have not been furnished to the joint committee, &c., &c., but which, in any case desired, can be furnished upon sufficient notice. Marked A l.

Very respectfully, your obedient servant,

THOS. LINCOLN CASEY,
Brig. Gen., Chief of Engineers.

[Committee No. 89.]

N.—*Letter provisionally approving project of Major Lydecker.*

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., October 12, 1882.

Hon. ROBERT T. LINCOLN,
Secretary of War:

SIR: I have the honor to submit herewith a preliminary project presented by Major G. J. Lydecker, Corps of Engineers, for carrying into effect the requirements of the act of July 15, 1882, for increasing the water supply of Washington.

In this project Major Lydecker explains what has been done in the way of surveys and examinations and makes recommendations as to the order in which the various operations should be undertaken and the manner of carrying them out. The portion of the project which, however, now requires action is that relating to the new conduit forming the extension of the aqueduct from the present receiving reservoir to the new reservoir provided for in the act.

This extension he recommends shall be by a tunnel running in a nearly straight line from the eastern end of the present aqueduct to the new reservoir and passing under the bed of Rock Creek where the line crosses that stream. The reasons assigned by him for preferring the tunnel to a surface conduit seem to be satisfactory, provided further examinations sustain his present opinion that solid rock will be found generally along the line.

He also recommends that this portion of the project be carried out by hired labor and not by contract, giving strong reasons for the preference, yet I am not satisfied that the work should be done in this way. All the acts of Congress in relation to public works look to their execution by contract when practicable, and it is hoped that specifications may be so drawn as to clearly cover all the details of work and enable contractors to bid understandingly. It is not necessary, however, that this point be definitely decided now, and it may therefore be deferred till more definite information regarding the character of materials through which the tunnel is to pass has been secured.

I therefore recommend that the project for extending the Washington Aqueduct by tunneling be provisionally approved, its final adoption to depend on further examinations confirming the present opinion that solid rock will be found generally along the proposed line; that Major Lydecker be authorized to sink one or more trial shafts for the purpose of ascertaining the character of the underlying materials, and that the question of the manner of executing the work on the tunnel, whether by hired labor or by contract, remain in abeyance for the present.

A preliminary sketch, showing the proposed route of the aqueduct extension, with a longitudinal section along the same, is herewith.

Very respectfully your ob'd't serv't,

H. G. WRIGHT,
Chief of Engineers, Brig. & Bvt. Maj. Gen'l.

[Indorsement.]

The recommendation of the Chief of Engineers is approved. By order of the Secretary of War.

JOHN TWEEDALE,
Chief Clerk.

WAR DEP'T, *Oct.* 17, '82.

[Committee, No. 90.]

O.—*Project for increasing water supply of Washington, etc.*

OFFICE OF WASHINGTON AQUEDUCT,
Washington, D. C., October 5, 1882.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A., Washington, D. C.:

GENERAL: I have the honor to submit the following project for carrying into effect the requirements of the "act to increase the water supply of the city of Washington, and for other purposes," approved July 15, 1882.

The first section directs that certain surveys be made, and specifies the manner in which title to lands required for the purposes of the act shall be obtained: in this connection it is provided, as a preliminary to active operations, that the "Secretary of War shall cause to be made a survey and map of the land necessary to extend the Washington Aqueduct from its present eastern terminus to the high ground north of Washington near Sixth street extended, and of the land necessary for a reservoir at that point, the capacity of which shall not be less than three hundred million gallons; and a like survey and map of the land necessary for a dam across the Potomac River at the Great Falls, including the land now occupied by the dam, and the land required for the extension of raid dam across Conn's Island to and upon the Virginia shore; and when surveys and maps shall have been made the Secretary of War and the Attorney-General of the United States shall proceed to acquire to and for the United States the outstanding title, if any, to said land and water rights, and to the land on which the gate-house at Great Falls stands by condemnation."

The data supplied by previous surveys within the designated limits have made any extended survey for the object in view unnecessary; and this is a fortunate circumstance, because, among the specific appropriations to carry out the provisions of the act in question, no provision is made for defraying the expenses of such surveys. In addition to the data available, however, certain examinations and local surveys were essential, before an intelligent presentation of the subject could be submitted; and I have assumed the responsibility of making the same, believing that they are properly chargeable to the items of appropriations "to pay for land to extend aqueduct, $51,370," and "to pay for land for reservoir, $35,250."

Since the date of my assignment to the charge of the work, all possible attention has been given to the compilation of this data, and to the preparation of a map showing the proposed line of conduit, limiting lines of new reservoir, and of all lands to be acquired. This map will be hurried to completion at the earliest date practicable, and will then be presented as the basis of proceedings in obtaining title to lands as required by the act.

The second section of the act directs the execution of several items of work, and the third appropriates for the same as follows:

1st. Extension of "the Washington Aqueduct from its present eastern terminus to the high ground north of Washington, near Sixth street extended." Appropriation $599,534.55, and for land for extension $51,370.

2nd. Construction "at that point of a reservoir of the capacity of not less than 300,000,000 gallons," and erection of "the necessary gate-house." Appropriation $431,273.75, and for land for reservoir $35,250.

3rd. Laying "such main connections as may be necessary to furnish to Washington and Georgetown an ample supply of water." Appropriation, $165,400.

4th. Completion of "the dam at Great Falls to the level of 148' above tide," and extension of "the same at that level across Conn's Island to the Virginia shore." Appropriation, $145,151.

5th. Raising "embankment between the Potomac River and the Chesapeake and Ohio Canal above the dam so as to protect the canal from the increased flooding which the completion of the dam will cause in times of high water, or pay to the Canal Company, in full satisfaction for all such flooding, the amount hereinafter appropriated for that purpose." Appropriation, $12,300.

For the immediate requirements of this project the first item is the important one, and its consideration has been the subject of the most careful study; believing, however, that a detailed statement on this point would extend this report unnecessarily, I simply submit for the present that the construction of a tunnel from the distributing reservoir to that proposed on the heights near 6th street extended will accomplish the desired object in the best and most substantial manner, at the least cost, and in the shortest time practicable. There is no reasonable doubt that this tunnel can be carried through solid rock in a direct line between the terminal points; and, under those circumstances, with the perfected machinery of the present day, its construction would become a simple piece of engineering work.

The cost and rate of progress would depend almost entirely on the character of machinery in use, and on the degree of intelligence with which the work is directed.

Based on the known cost of completed work of like character, $8.00 per cubic yard for the excavation would be an outside estimate; it would, in all probability, cost less. The length of tunnel will be about 21,400 feet, requiring a total excavation, including shafts, of about 66,250 cubic yards. Eestimated at $8.00 per cubic yard, the total cost of excavation would be about $530.000, leaving a balance in the amount appropriated of $70,000 available for contingencies; such, for instance, as lining for tunnel wherever it might be found necessary.

If the tunnel can be driven in solid rock (and every indication favors this assumption), it is apparent that we can rely with certainty upon a continuous progress of the work of construction, regardless of season or weather upon its permanence, without expenditure for repairs, and upon its subsequent enlargement at small expense.

The only alternative to a tunnel would be a surface conduit, which would offer none of the advantages referred to above, while the natural features would require a very considerable increase in its length, in order to avoid excessive excavations and complicated engineering difficulties, such as would follow its construction on a direct line. Besides, the surface conduit would demand the appropriation of a continuous strip of land, which would not be the case if the work is made entirely in tunnel, and it is very doubtful if this land could be acquired with the sum allotted for that purpose.

With these views I have no hesitation in recommending the adoption of the tunnel system, leaving minor details to be determined upon after obtaining the conclusive data that will be supplied in sinking the initial shaft, at the site of the new reservoir. If compact, solid rock is not reached within a reasonable limit, the project can be modified, before arriving at any expenditure approximating that which would have

been required for a series of preliminary borings, sufficient to warrant a positive solution of the question.

This work should be done by hired labor, and the purchase of material in open market, as that is the only way in which its rapid and economical construction can be obtained. The character of the work is such that its details must, in a marked degree, be determined during its progress, and they can not be intelligently specified beforehand.

The contingencies involved, being matters of speculation, would advance a contract price to the highest possible figures, in this way forbidding to the work any possible gain due to the absence of suspected difficulties. The pressing demand for the immediate beginning of the work, its accomplishment in the shortest possible period of time and in the most perfect manner, is opposed to delays necessary for advertisement and awards, attended by the risk of getting finally an inefficient or irresponsible contractor. The work is so extensive, and will require so large an original outlay to supply the machinery required for its rapid prosecution, that it is doubtful if many among the competing bidders would possess the requisite capital, experience, and energy.

The site selected for the new reservoir is in the depression east of the grounds of the Howard University, and the area of land that must be acquired for this purpose is 66 acres. It can not be stated at this writing whether the sum appropriated is sufficient, but that question has no material bearing on the immediate work in view. In the reservoir as located the excavation and embankment required in its construction are equalized as nearly as practicable, being approximately 500,000 cubic yards. The sum appropriated is believed to be ample. It is proposed to do this work by contract, after advertising in the usual manner.

Detailed plans for raising and extending the dam at Great Falls have not yet been prepared. The work will be similar in character to that of the present dam, and, when commenced, it is proposed to carry it on by hired labor and purchases in open market for substantially the same reasons as heretofore stated in relation to the Aqueduct extension. This question will be made the subject of a special report at an early date.

Consideration of the question relating to the necessary main connections for furnishing an ample water supply to Washington and Georgetown is deferred for further examination, as is also that relating to the protection of the Chesapeake and Ohio Canal as provided for in the act.

In addition to increasing the water supply the act provides "for the erection of suitable fish-ways at the Great Falls of the Potomac and at the dam to be constructed under the provisions of this act, in accordance with plans and specifications to be prescribed by the United States Commissioner of Fish and Fisheries," and appropriates for that purpose the sum of $50,000. These plans have not yet been prepared, but arrangements have been made to commence the necessary preliminary surveys, to be conducted under the supervision of an agent designated by the Hon. Commissioner.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A

[Committee No. 91.]

P.—*Indorsements.*

[First indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
July 20, 1883.

Respectfully submitted to the Hon. the Secretary of War, with recommendation that the tunnel project presented by Major Lydecker in his report of October 5, 1882, for the extension of the aqueduct from the present distributing reservoir beyond Georgetown to the site of the proposed new reservoir on the high grounds north of Washington, near Sixth street extended, which was provisionally approved, be finally adopted—the trial shaft at the eastern terminus of the proposed conduit, and other examinations showing a reasonable certainty that material proper for tunneling will be found generally along the proposed line.

It is also recommended that Major Lydecker's projects for extending the dam at the Great Falls, and for the new reservoir, be approved; and that he be authorized to prepare detailed drawings and specifications for all the works with a view to inviting proposals for the construction of the same as soon as possession of the necessary land is obtained. Previous papers herewith.

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen'l.

[Second indorsement.]

The recommendations of the Chief of Engineers are approved.

ROBERT T. LINCOLN,
Secretary of War.

WAR DEPT., *July 27*, '83.

[Committee No. 92.]

Q.—*Application for authority to advertise for cast-iron water-pipe and to have specifications for same printed.*

OFFICE OF WASHINGTON AQUEDUCT,
Washington, D. C., August 7, 1883.

Brig. Gen'l. H. G. WRIGHT,
Chief of Engineers, U. S. A., Washington, D. C.:

GENERAL: I have the honor to inclose herewith request for authority to advertise for proposals for cast-iron water-pipe, and to have specifications for the same printed.

The large pipe is designed for the reinforcing main for increasing the water supply of Washington, and it is desired to procure it as soon as practicable, in order that it may be placed in position on New Jersey Ave. in advance of the contemplated improvement of that street, and have the work completed in time to avoid any delay on that account. The smaller pipe is designed for the drainage system contemplated in the new reservoir, and it will be required in the commencement of that work. By advertising for proposals now we will only be able to secure its delivery in time to avoid delay to that work.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 93.]

Q[1].—*Letter of Chief of Engineers to Maj. G. J. Lydecker, stating action on last letter.*

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., August 11, 1883.

Major G. J. LYDECKER,
Corps of Engineers, Washington, D. C.:

SIR: Your letter of the 7th instant, requesting authority to advertise for 3,000 tons of cast-iron water-pipes, and special castings for increasing water supply of Washington, D. C., and inclosing letter addressed to the chief clerk of the War Department, asking authority to publish the advertisement, and print specifications for the same, was duly received.

Your letter to the chief clerk of the War Department has been forwarded with favorable indorsement.

By command of Brig. Gen'l Wright.

Very respectfully, your obdt. servt.,

H. M. ADAMS,
Captain of Engineers.

[Committee No. 94.]

R.—*Approval of award of contracts for certain pipe, etc.*

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., September 18, 1883.

Major G. J. LYDECKER,
Corps of Engineers, Washington, D. C.:

SIR: Your letter of the 7th instant submitting abstract, with copies of the bids received for furnishing cast-iron water-pipes and special castings for increasing the water supply of Washington, D. C., received in response to your advertisement of August 8, 1883, has been received.

Your recommendation that the contract for 48", 12", 8", and 6" pipe, and special castings be awarded to Andrew H. McNeal, of Burlington, N. J., and that the contract for the 75" pipe be awarded to the West Point Foundry Association, of Cold Spring, New York, the lowest responsible bidder, respectively, is approved.

By command of Brig. Gen'l Wright.

Very respectfully, your obdt. servt.,

JOHN G. PARKE,
Lieut. Col. of Engineers, Bvt. Major General, U. S. A.

[Committee No. 95.]

S.—*Approval of contract with the West Point Foundry Association, Cold Spring, New York, for furnishing cast-iron water-pipes.*

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., October 16, 1883.

Major G. J. LYDECKER,
Corps of Engineers, Georgetown Station, Washington, D. C.:

SIR: Your letter of the 13th instant, returning contract in quintuplicate entered into September 20, 1883, with the West Point Foundry Association, Cold Spring, New York, with bond and duplicate for furnishing cast-iron water-pipes for increasing the water supply of Washington, D. C., the same having been perfected as required by Department letter of the 6th instant, has been received.

The contract is approved, and three copies of it, with one of the bond, are herewith returned to be disposed of in accordance with law and regulations.

By command of Brig. Gen'l Wright.

Very respectfully, your obdt. servt.,

JOHN G. PARKE,
Lieut. Col. of Engineers, Bvt. Major General, U. S. A.

[Committee No. 96.]

T.—*Approval of rejection of J. H. Dewees & Co's. bid for construction of dam.*

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., October 23, 1883.

Major G. J. LYDECKER,
Corps of Engineers, Georgetown Station, Washington, D. C.:

SIR: Your letter of the 13th inst., transmitting abstract with copies of the bids received in response to your advertisement of August 29, 1883, asking proposals for construction of dam for increasing the water supply of Washington, D. C., has been received.

Your recommendation that the bid of Messrs. J. H. Dewees & Co. (the lowest) be rejected and that the contract be awarded to Messrs. Chittenden Brothers, the lowest responsible bidder, is approved.

By command of Brig. Gen'l Wright.

Very respectfully, your obedient servant,

JOHN G. PARKE,
Lieut. Col. of Engineers, Bvt. Maj. Gen'l, U. S. A.

[Committee, No. 97.]

U.—*Letter of J. H. Dewees & Co. protesting award of contract for tunnel to Beckwith & Quackenbush.*

The Hon. SECRETARY OF WAR:

SIR: We are bidders for work on the new water-supply works of Washington, D. C., to the amount of 464,800.00. We made this bid in response to a public advertisement, and we have a right to assume that the object of the advertisement was to se-

cure the lowest responsible bid. Our bid, as we are informed and believe, is $83,200.00 lower than that of Beckwith and Quackenbush, of N. Y., and $76,093.00 less than that of Eugene Robinson, of Detroit, Mich. We learned some days since by the public newspapers, and yesterday by information orally communicated to our associate, Major Louis E. Johnson, by Gen. H. G. Wright, Chief of Engineers of the U. S. Army, that the contract is about to be awarded to Beckwith and Quackenbush at their bid of $83,200.00 higher than ours. Against this we protest. It is neither just to us nor to the Government. It favors private parties at the public expense, and for no reason.

We are responsible bidders, and are prepared to convince any one of that fact who is willing to see the lowest responsible bidder prevail. We shall not rest under the imputation of having made a bid we could not execute, and shall not forego the profits we are entitled to make by the proposed work, without a vigorous protest wherever the same can be heard. With the highest respect for you, we venture to remind you that you are responsible for any acts of your subordinates, and that the engineer department of the District government is in this matter under your control. We ask you to stay the award of the contract to any bidder higher than ourselves, and assure you that our bond will be ready to secure the performance of the contract to which we are entitled. We will add that neither Major Lydecker nor Lt. Hoxie have any right to favor other parties on the pretense that, as professional experts, they believe we can not profitably do the work under our bid. That is our affair. We have a right to the contract, whether we make or lose by it, if we give you satisfactory security.

Appealing to your sense of justice and to your official obligation to see that the Government is served in preference to private persons,

We are, most respectfully, your obedient servants,

J. H. DEWEES & CO.,
1701 *Boundary St., Washington, D. C.*

WASHINGTON, D. C.,
October 30th, 1883.

[Committee, No. 98.]

U.—*Answer of Secretary of War to letter of J. H. Dewees & Co.*

WAR DEPARTMENT,
Washington City, November 2, 1883.

GENTLEMEN: I have the honor to acknowledge the receipt of your letter of the 30th ultimo, protesting against the award of a contract for work on the new water-supply works of Washington, D. C., to Beckwith and Quackenbush, and claiming that the contract should be awarded to you, for the reason that you were the lowest bidders, and to state in reply that I have re-examined the papers in the case and see no reason, either in them or in the statements contained in your communication, to change the views which led me to approve the recommendation of Major Lydecker, the officer in charge of the improvements, and General Wright, the Chief of Engineers.

Very respectfully,

ROBERT LINCOLN,
Secretary of War.

Messrs. J. H. DEWEES & CO.,
1701 *Boundary St., Washington, D. C.*

[Committee, No. 99.]

V.—*Approval of contract with Maloney & Gleason for construction of reservoir.*

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., November 5, 1883.

Major G. J. LYDECKER,
Corps of Engineers, Georgetown Station, Washington, D. C.:

SIR: Your letter of the 3d inst., transmitting contract in quintuplicate with bond in duplicate, entered into October 30, 1883, with Maloney and Gleason, of Washington, D. C., for construction of reservoir for increasing the water supply of Washington, D. C., has been received.

The contract is approved, and three copies thereof, with one of the bond, are herewith returned, to be disposed of in accordance with law and regulations.

By command of Brig. Gen'l Wright.

Very respectfully, your obedient servant,

JOHN G. PARKE,
Lieut. Col. of Engineers, Bvt. Maj. Gen'l, U. S. A

[Committee, No. 100.]

W.—*Approval of contract with Chittenden Bros. for construction of dam.*

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., November 9, 1883.

Major G. J. LYDECKER,
Corps of Engineers, Georgetown Station, Washington, D. C.:

SIR: Your letter of the 7th inst., transmitting contract in quintuplicate (with bond in duplicate) entered into November 7, 1883, with Chittenden Brothers, of Washington, D. C., for construction of dam for increasing the water supply of Washington, D. C., has been received.

The contract is approved, and three copies thereof, with one of the bond, are herewith returned, to be disposed of in accordance with law and regulations.

By command of Brig. Gen'l Wright.

Very respectfully, your obedient servant,

JOHN G. PARKE,
Lieut. Col. of Engineers, Bvt. Maj. Gen'l, U. S. A.

[Committee, No. 101.]

X.—*Request for authority to lay iron pipe by day's labor, etc.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., December 7, 1883.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A., Washington, D. C.:

GENERAL: I am advised by the contractor for furnishing cast-iron water-pipes for increasing the water supply of Washington, D. C., that they are about to commence its delivery, and I would therefore respectfully apply for written confirmation of the verbal authority heretofore given me, to execute the work of laying the same and making all necessary "main connections," by hired labor and the purchase of material in open market.

The necessity for this course, in this character of work, is so obvious that a written record of the reasons leading to its adoption seems uncalled for.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee, No. 101.]

X[1].—*Letter granting authority to lay iron pipe by day's labor, etc.*

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., December 10, 1883.

Major G. J. LYDECKER,
Corps of Engineers, Washington, D. C.:

SIR: Your letter of the 7th instant is received. The verbal authority heretofore given you to execute the work of laying the cast-iron water-pipes for increasing the water supply of Washington, D. C., and to make all necessary "main connections"

by hired labor and purchase of material in open market is confirmed, the nature of the work not admitting of its being executed by contract.

By command of Brig. Gen'l. Wright.

Very respectfully, your ob'd't serv't,

JOHN G. PARKE,
Lieut. Col. of Engineers, Brt. Major-General, U. S. A.

[Committee No. 103.]

Y.—*Recommendation to modify plan for building dam.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., February 29, 1884.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A., Washington, D. C.:

GENERAL: I have the honor to recommend a modification in the plans for building the dam at the Great Falls of the Potomac River. This is the substitution of a solid masonry dam for the crib-work which the original plans contemplate should be placed across the main Virginia channel of the river.

The original plans and estimates for the Great Falls dam were based upon the map of the locality constructed under the direction of Capt. (now General) M. C. Meigs, in 1856.

From the information derived from this map it was considered that the total length where it was advisable to put in a crib-dam was about 450 feet. Subsequent surveys and measurements, however, showed that the masonry dam could be built without any difficulty over all but about 260 feet, in which space was embraced the main and deepest channel of the river.

It is now considered advisable to do away with the crib-dam entirely, and substitute for it a masonry dam over this space of 260 feet, thus making the structure homogeneous throughout its entire length. Further detailed examinations and surveys have shown the practicability of doing this at an increased cost estimated at only $8,560 above that contemplated in the contract as it stands. If this modification is approved it is proposed to build an auxiliary rip-rap dam across the Virginia channel at the head of Conn's Island for turning most of the water into the Maryland channel and facilitating thereby the construction and maintenance of the coffer dams required at the site of the permanent work. A cross-section of the proposed dam at the deepest part of the river is sent herewith; its general details are similar to the other parts of the masonry dam contemplated in the existing plan, and during the process of construction all the masonry is to be kept dry by substantial coffer-dams, pumping, etc. The estimated cost of the auxiliary riprap dam, coffer-dams, pumping and contingencies required by reason of the proposed change is taken, after careful examination, at $15,000, and the terms agreed upon with the contractors involves the payment to them of this amount, in installments, in addition to the regular contract prices for masonry. These terms are believed to be very reasonable and just, and are respectfully submitted for approval. The cost of the dam under the original estimates on which the contract was let is $94,293.75, as follows:

1,125 cubic yards coping masonry, at $24.50	$27,562.50
1,550 cubic yards cut-stone masonry, at $20.75	32,162.50
2,000 cubic yards concrete masonry, at $5.50	11,000.00
450 cords stone-filling in cribs, at $6.50	2,925.00
475 cords rip-rap backing, at $7.25	3,443.75
1,000 cubic yards clay and gravel backing, at $1	1,000.00
175,000 feet B. M., pine timber and plank, at $45	7,875.00
33,000 feet B. M., oak timber, at $75	2,475.00
50,000 pounds wrought-iron bolts and cramps, at 7 cents	3,500.00
2,500 pounds spikes and nails, at 6 cents	150.00
1,800 cubic yards excavation, at $1	1,800.00
8,000 square yards area to be cleared, at 5 cents	400.00
Total	94,293.75

The estimated cost of the dam under the contract with the proposed modification is $102.790, as follows:

1,125 cubic yards coping, at $24.50	$27,562.50
1,810 cubic yards masonry, at $20.75	38,802.50
2,300 cubic yards concrete, at $5.50	12,650.00

500 cords rip-rap, at $7.25	$3,625.00
40,000 pounds iron bolts and cramps, at 7 cents	2,800.00
1,900 cubic yards excavation, at $1	1,900.00
9,000 square yards clearing, at 5 cents	450.00
Coffer-dams, wing-dams, etc	15,000.00
Total	102,790.00

This last estimate is based upon the same prices throughout for material, etc., the extra cost being for riprap coffer and wing dams, pumping, etc.

The amount appropriated for the dam is $145,151, and the above cost is thus seen to be well within the limit of the appropriation. It is understood that this is to be regarded simply as a modification of the contract and the coffer-dams, etc., to be paid for as extra work, and that the contractors will make no claim whatever on account of the change.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 104.]

Z.—*Transmittal of supplemental contract with Chittenden Bros.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., March 27, 1884.

Brig. Gen. JOHN NEWTON,
Chief of Engineers, U. S. A., Washington, D. C.:

GENERAL: I have the honor to forward herewith copies, in quintuplicate, of a supplemental contract entered into with Chittenden Brothers for substituting a solid masonry dam for a crib-work dam across the main channel of the Potomac at Great Falls.

It is requested that if this supplemental contract meets with your approval it be forwarded to the Secretary of War for his action.

One of the original bondsmen, Mr. John W. Powell, has not signed the supplemental bond on account of absence. He has signified his willingness and intention of doing so as soon as he returns to Washington from Iowa. The papers are sent without his signature in order that action may be taken thereon as soon as practicable and the contractors enabled to commence work.

Very respectfully, your ob'd't servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[First indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
April 2, 1884.

Respectfully submitted to the Hon. the Secretary of War.

Subsequent detailed surveys of the site of the dam for increasing the water supply of Washington, D. C., now under construction across the Potomac River above the Great Falls, have determined the practicability of building the dam *entirely* of masonry instead of partly of crib-work as originally designed, at an excess of cost for the whole structure of about $8,500, a sum inconsiderable in view of the great advantages to be secured by the change of plan; and Major G. J. Lydecker, Corps of Engineers, the officer in charge, has, in accordance with the provision of the original contract in regard to modification, submitted the within supplemental contract providing for the construction of the masonry dam, which I beg leave to recommend for approval. The original contract is herewith.

JOHN NEWTON,
Chief of Engineers, Brig. and Bt. Maj. Gen.

[Second indorsement.]

Respectfully returned to the Chief of Engineers, with supplemental contract approved by the Secretary of War.

By order of the Secretary of War.

JOHN TWEEDALE,
Chief Clerk.

WAR DEPT., *Apr.* 5, '84.

[Committee No. 105.]

A A.—*Transmittal of cross-section drawing of proposed dam at Great Falls.*

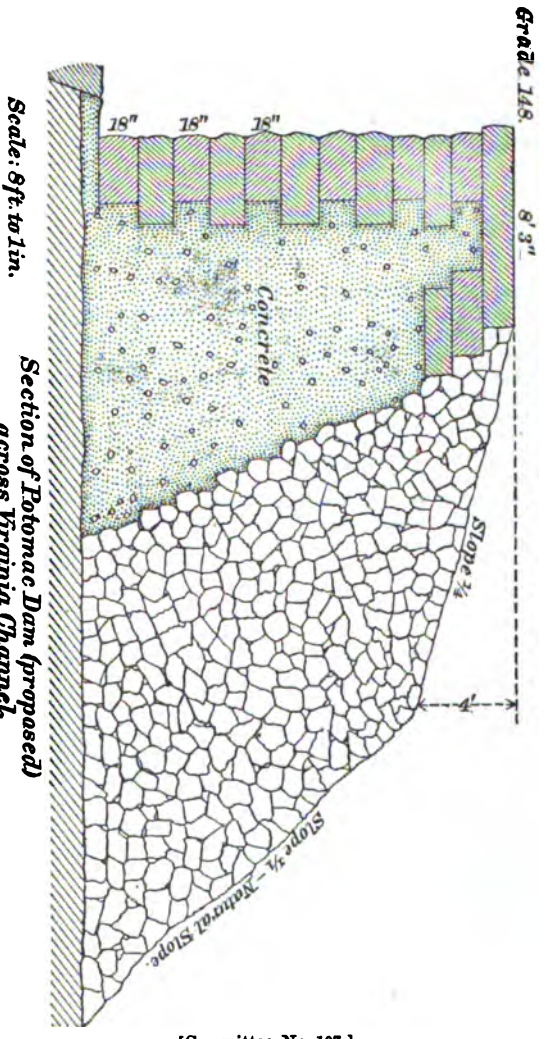
OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., March 5, 1884.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. A., Washington, D. C.:

GENERAL: I have the honor to enclose herewith cross-section referred to in letter of the 4th inst., which was omitted to be forwarded in my letter of the 29th ult.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.



[Committee, No. 107.]

BB.—*Maloney & Gleason ask for the privilege of transferring their contract to Gilbert Peterson, of Lockport, N. Y.*

OFFICE OF NEW RESERVOIR,
Washington, D. C., April 1st, 1884.

Maj. G. J. LYDECKER,
Corps of Engineers, U. S. A.:

DEAR SIR: Believing as we do that you are very much interested in the successful prosecution of all the work under your charge, particularly the building of the new

water-works, and owing to unforeseen circumstances we find ourselves in the position of being unable to procure the necessary plant to push the work (under our contract, Oct. 30, 1883, for construction of reservoir) in a manner to give you satisfaction, and complete it in the limited space of time allowed for its construction. Therefore, we beg that we be allowed the privilege of transferring or making any other change in the contract that will allow Mr. Gilbert Peterson, of Lockport, N. Y., to draw the money, as he has all the necessary plant for the prosecution of this work, and will place it on the work immediately. He is willing to accept the contract at our prices, and under all conditions that we are under to you, and will either furnish bonds himself or we will allow the old bonds to remain as they are, whichever will be most satisfactory to you.

Respectfully submitted.

MALONEY & GLEASON.

[1st indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, April 2, 1884.

Respectfully referred to Lieut. Thomas W. Symons, Corps of Engineers, superintending engineer, for remark.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[2nd indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, April 2, 1884.

Respectfully returned to Major G. J. Lydecker, Corps of Engineers. From my examination into and knowledge of this matter, I am very thoroughly convinced that the best interests of the Government will be furthered by the transfer of this contract. Messrs. Maloney and Gleason, as they say, and, as is very evident to me, can not carry their contract to completion in the specified time, without the addition of an expensive plant, which they say they are unable to procure. If the transfer can be made the work will proceed without interruption; if it can not, the present contractors will be likely to fail and the Government be put to the expense and delay of readvertising and reletting the contract. Mr. Petersen appears to be better able in every way to carry on the work successfully than the present contractors. I would recommend that the present bondsmen be retained, as they are familiar with the requirements of the work, and thoroughly understand their responsibility.

THOMAS W. SYMONS,
Lieut. of Engineers, U. S. A., Superintending Engineer.

[3rd indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, April 4, 1884.

Respectfully forwarded to the Chief of Engineers, U. S. A., recommending that Maloney and Gleason be permitted to become "functus officio," transfer their contract to Mr. Gilbert Peterson as requested, and constitute him their executor so far as all matters relating to this cantract is concerned, provided that the obligation of the contractors' bond be duly extended to cover this transfer or assignment. Mr. Peterson was the next lowest bidder on this work when the contract was originally let, his bid being $323,512.50, as against $298,980.00, bid by Maloney and Gleason, but his bid for earthwork (excavation and puddling), which constitutes the most important part of the work, was the lower by $29,560.00, his bid on these items amounting to $200,540.00 against $230,100.00, bid by Maloney and Gleason. Mr. Peterson is reported to be a contractor of considerable experience. Inclosed herewith is a copy of a letter specifying the plant which he would put on the work at once if the transfer is made, and if this plant is all in good order it would appear to be sufficient for completing the work within the time specified in the contract.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Fourth indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
April 8, 1884.

Respectfully submitted to the Secretary of War. Section 3737 forbids the transfer of a contract upon pain of annulment. Upon this statute the Attorney-General of the United States (Opinions, Vol. 16, pp. 277–279) remarks:

"The statute in question is, however, intended only for the benefit of the United States, and while it is said that such transfer shall cause the annulment of the con-

tract or order transferred, it is intended only that it shall do so in case the United States declines to recognize such transfer. While, therefore, the United States may avail itself of such transfer to annnul the contract, it is not compelled so to do."

In the case in question the proposed transfer is in the interest and for the benefit of the U. S., and is recommended, if it can legally be made. In this connection attention is also invited to Digest of Opinions, 2d Comptroller, p. 87, par. 610, and to Digest of Opinions of Judge-Advocate Gen., p. 190, foot-note 3. In view of the above it is respectfully recommended that the matter be referred to the proper law officer of the Government for decision. The contract is herewith.

JOHN NEWTON,
Chief of Engineers, Brig. and Bt. Maj. Gen.

[5th indorsement.]

Respectfully referred to the 1st Comptroller of the Treasury.

The Secretary of War believes, from the papers in the case, that it would be to the interest of the United States to make the transfer suggested, but invites the opinion of the 1st Comptroller as to the legality of doing so.

By order of the Secretary of War.

JAY STONE,
Actg. Chief Clerk.

WAR DEPT., *Apr.* 9, 1884.

DEPARTMENT OF THE TREASURY,
OFFICE OF THE FIRST COMPTROLLER,
April 10, 1884.

Respectfully returned to the Hon. Secretary of War with the opinion that the law does not authorize the assignment or transfer. It is certainly true that if the proposed transfer should be permitted the original contractor would be estopped from objecting that payment should be made to the assignee of the contract, but this does not justify officers in permitting that to be done which is unlawful.

WM. LAWRENCE,
First Comptroller.

[Committee, No. 108.]

BB[1].—*Letter of G. Peterson, specifying plant he will put into work.*

GEORGETOWN, D. C., *April 3rd*, 1884.

G. J. LYDECKER,
Major of Engineers:

DEAR SIR: The following is a list of the machinery I could put on the reservoir as soon as they could be shipped from Buffalo: 1 steam-shovel, capacity 1,000 yards per day; 40 Judd horse-excavators, capacity 50 yards per day each; 20 Schlosser horse-excavators, capacity 50 yards per day each; 2 stone crushers.

I have cars and track to run earth from steam-shovel. I have also a controlling interest in another steam-shovel that can be put on if needed. Also have horses and carts and wagons; also have the means and experience to complete the work in the specified time.

Respectfully, yours,

G. PETERSON.

True copy.

THOMAS W. SYMONS,
Lieut. of Engineers.

[Committee, No. 109.]

CC.—*Transmittal of copy of correspondence with Senate committee relative to new reservoir.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., January 17, 1885.

Brig. Gen. JOHN NEWTON,
Chief of Engineers, U. S. A., Washington, D. C.:

GENERAL: I have the honor to transmit herewith copy of correspondence which I have had with the Senate Committee on the District of Columbia, in relation to a

resolution introduced by Senator Morgan concerning the construction of the new reservoir near Howard University.

I would explain that I learned on inquiry at the committee-room that the committee had deemed it better to communicate in this direct manner, and not through the regular official channel in this case, for the reason that no formal report in the matter was desired in advance of final action on the resolution in question, and that my direct reply was verbally sanctioned of the Hon. Secretary of War.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee, No. 110.]

CC[1].—*Correspondence between Maj. Lydecker and the Senate Committee on the District of Columbia.*

COMMITTEE ON THE DISTRICT OF COLUMBIA, U. S. SENATE,
Washington, D. C., Jan'y 9, 1885.

Major GARRETT J. LYDECKER,
Eng'r, &c., Washington, D. C.:

SIR: By direction of the Committee on the District of Columbia of the Senate, I have the honor to refer to you herewith a resolution introduced in the Senate by Senator Morgan, having reference to the construction of the new reservoir, with request that you will return same at your earliest convenience with your opinion as engineer in charge of the work whether any unforeseen difficulties have arisen in its progress not contemplated or provided for in the act and appropriations therefor, and the necessity or otherwise for the passage of said resolution.

Respectfully,

THOS. J. WHITE,
Clerk.

[Senate Mis. Doc. No. 17, 48th Congress, 2d session.]

IN THE SENATE OF THE UNITED STATES.

December 16, 1884.—Referred to the Committee on the District of Columbia and ordered to be printed.

Mr. MORGAN submitted the following resolution:

Resolved by the Senate, That the Secretary of War be directed to inform the Senate whether in the construction of the new reservoir in the District of Columbia, under the act approved July 15, 1882, any serious natural difficulties have been encountered not contemplated or adequately provided for in the plans for said work as approved; also whether any changes or modifications in or of the said plans have been made at any time during the progress of said construction; and if so, on whose recommendation and for what causes were such changes or modifications made.

2. That the Secretary of War be directed to furnish at the earliest practical date, for the use and information of the Senate, a topographical map of said reservoir, embracing as much of the contiguous terrain as may be rendered liable to the process of filtration through permeable strata by the establishment of a water-head such as is contemplated by the existing plans; the map to embody shading and indices showing the location, area, and soundings of the several deposits of decayed vegetable matter, ooze, or quicksand known to exist within the floor limits of the reservoir, and also a report of chemical analysis of specimens of soil taken from each of said deposits; and also a report from the Chief of Engineers, U. S. A., stating whether the existing plans for constructing the reservoir afford adequate expedients to deal with the said natural difficulties, and if not, what modifications of the said plans are required to guarantee purity in the water to be supplied from the reservoir when completed and security from leakage by filtration through permeable strata in the contiguous earth.

3. That the Secretary of War also send to the Senate an estimate of the cost of making any changes in the plans of constructing the reservoir that may be needed to make it more secure, and to give greater purity to the water supply.

COMMITTEE ON THE DISTRICT OF COLUMBIA,
UNITED STATES SENATE,
Washington, D. C., Jan'y 10, 1885.

Major G. J. LYDECKER,
Eng'r, &c., Washington, D. C.:

SIR: The chairman (Hon. John J. Ingalls) has handed me the inclosed papers for reference to you, with the "Morgan" resolution sent yesterday, for consideration.

Very respectfully,

THOS. J. WHITE,
Clerk.

The accompanying diagram gives an approximate outline of the reservoir. It does not purport to be drawn to scale. The red lines indicate the approximate courses of the streams that flow through the basin. The brown shading indicates the location and area of the most formidable of the quicksand beds. The violet shading indicates the location and area of the principal deposits of decayed vegetable matter formed by the wash of leaves, &c., from the formerly wooded hillside above. This deposit is so bad that when uncovered in hot weather it emitted offensive vapor.

All the beds of quicksand carry more or less decayed vegetable matter or muck.

It is proposed by the existing plans to leave this material to form part of the floor of the reservoir. A modification suggested by the assistant engineer, Mr. Partridge, contemplates raising the floor (that is, making the reservoir shallower) above the junction of the two principal streams, with the intention of covering the quicksands with a thin film of sound earth. The depth of the westernmost or largest bed of quicksand varies from seven to eleven feet, and in places or pockets reached a depth of seventeen.

Originally it was covered on the bed of the creek by a layer of white flint gravel about 18 inches in thickness. It appears to extend back under the hill on which the Schentzen Park stands, forming a permeable stratum in that direction; the plans provide no mode of dealing with it. Mr. Partridge proposes to hide it under a thin film of earth taken from the hill north of the basin. The bed of quicksand in the northeast corner of the reservoir is generally shallower than the one just mentioned, but it carries a much larger proportion of decayed vegetable matter, leaves, wood, &c. It is mainly of a mucky character and would not sustain a team in the dryest portion of last summer's drought. The purely vegetable deposit shaded in violet ink on the diagram extends along the entire base of the hill forming the eastern embankment as shown. It varies in depth from four to eight feet and in warm weather emits an offensive odor.

The other beds are of less importance. Altogether the quicksands and muck beds form about one-fourth to one-third of the area of the floor of the reservoir. In the construction of the embankment itself the protecting slope wall is not carried down to the bottom of the reservoir, but is sprung from a beam or shelf beginning ten feet from the bottom, leaving that portion of the embankment unprotected.

This device was attempted in the original plans of the existing reservoir at Drover's Rest, Georgetown, but was condemned by the late Silas Seymour, of New York, who had been specially employed by President Buchanan to revise the plans of that work. Mr. Seymour's views will be found in Senate Mis. Doc. No. 83, 38th Congress. 1st session. Mr. Seymour's views were endorsed by Messrs. James B. Kirkwood, Alfred N. Craven and James Slade, at the time the most eminent hydraulic engineers in the United States. An accompanying diagram shows the cross-section of the slope wall and beam, as per the existing plans, with a representation of the plan adopted under the recommendations of Silas Seymour. It will also be observed by reference to the diagram that the influent and effluent gate-houses are situated very close together in the extreme southwestern angle of the reservoir. No provision being made for any outflow other than that afforded by the effluent gate-house, of course the main body of the water in the reservoir will be stagnant, except as it may be agitated by the wind, and there can be no flow of currents through it of fresh water incoming from the Potomac.

The only method of renewing the particles held in the main body, will be by such raisings or lowerings of the general level of the flow-line as may be incidental to the exigencies of supply. This is a fault, though not necessarily a formidable one, provided the floor is made clear and sound. But it is a fault which would have vastly added effect under bad conditions of floor.

On the whole, the work now contemplated is not calculated to guarantee purity in the water to be supplied from or security from leakage by filtration through the permeable strata of which the quicksands discovered indicate the existence.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., January 15, 1885.

Hon. J. J. INGALLS,
Chairman Senate Committee, D. C.:

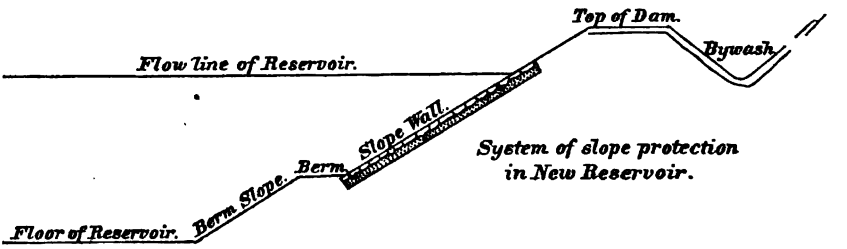
SIR: In response to request contained in letter from your committee, dated January 9, 1885, I have the honor to state that in the construction of the new reservoir, near Howard University, no material difficulties have as yet been developed that were not contemplated by me as likely to arise in its progress—none that are not provided for in the act making appropriations for the work—or in the specifications under which the same is now being prosecuted. I can see no necessity for the passage of the resolution in question, nor imagine what good can be accomplished thereby.

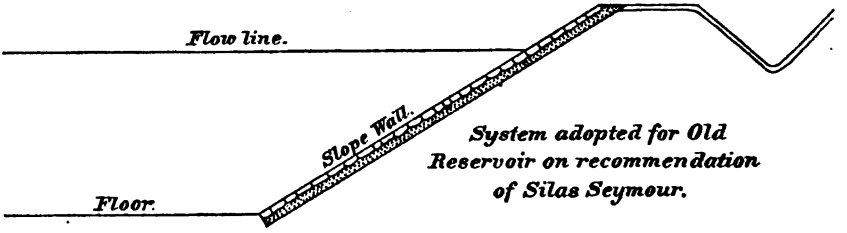
In addition to this categorical answer to the question submitted to me, I desire to add that it is unreasonable to presume that any engineer would not have foreseen the probability of a variation in the character of material, such as is suggested by the resolution, in the excavation of an area so extended as that included in the proposed reservoir. The existence of quicksand, muck, decaying vegetable matter, &c., has been known from the start, but it is also known that a stratum of compact, impermeable clay exists at the level of the proposed bottom of the reservoir throughout most of its extent.

To prepare such a map as is indicated would be a question of considerable time and expense, and would be of insignificant value in determining exactly what should be done at each point, as compared with the precise information that will be furnished when the general excavation is completed. At that time much of the existing quicksand area will have become drained, dried out, and easily removable.

Very respectfully,

G. J. LYDECKER,
Major of Engineers, U. S. A.





[Committee No. 111.]

DD.—*Letter transmitting copies of applications of contractors for extension of time.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., June 29, 1885.

Brig. Gen. JOHN NEWTON,
Chief of Engineers, U. S. A., Washington, D. C.:

GENERAL: The contracts with Beckwith and Quackenbush, dated October 29, 1883, for constructing the tunnel under the appropriation for "increasing the water supply of Washington, D. C.," and with Maloney and Gleason, dated October 30, 1883,

for construction of reservoir, and with Chittenden Brothers, dated November 7, 1883, for construction of dam at the Great Falls, required that the several works should be completed on or before June 30, 1885. All the contractors have failed in this respect, and each has applied for an extension of time as follows: Beckwith and Quackenbush (tunnel), to October 1, 1886; Maloney and Gleason (reservoir), to June 30, 1886; Chittenden Brothers (dam), to January 1, 1886. The grounds on which these applications are based are set forth in the several letters from the contractors, copies of which are transmitted herewith. In my opinion, however, there is no valid reason why the *dam* and *reservoir* should not have been completed within the limits of time fixed by the contracts, but the difficulties encountered in the construction of the tunnel, and delays for which the contractors can not properly be held responsible, have been such that this work could not be completed on time, though better progress might and should have been made. Not only will the public feel this failure to complete the work at the specified time (whereby the period of suffering from the present inadequate water supply will be prolonged), but the cost of the work will be increased to the extent of the cost of supervision and inspection for the periods of extension. It seems proper, therefore, that if the contracts are extended, the contractors for the dam and reservoir should make good to the Government some (say one-half) of this increased expense. The inclosed tracing shows the extent to which the tunnel has progressed, the parts in black indicating completed excavation; the time of completion will depend on that required to open the tunnel from the east shaft to the Champlain Avenue shaft, and by forcing the work the contractors should be able to finish by the 1st of July, 1886, to which date I recommend that this contract be extended. I would also recommend that the contract for the reservoir be extended to the same date, as no use can be made of it until after the completion of the tunnel.

It is desirable that the dam should be finished as early as possible, because an increased height of water in the reservoirs will result; I recommend an extension to November 1st, 1885.

The contractors for the tunnel have been credited with work up to June 1st to the amount of $382,138.16; total appropriation for tunnel, $599,534.55; the corresponding figures for the reservior are, *work*, $185,063.64; appropriation $431,273.75, and for the dam, work, $69,309.51; appropriation, $145,151.00.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 112.]

DD[1].—*Letter of the Chief of Engineers to the Secretary of War, submitting letter of Maj. Lydecker, etc.*

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., July 3, 1885.

Hon. WM. C. ENDICOTT,
Secretary of War:

SIR: In pursuance of the provisions of "An act to increase the water supply of the city of Washington, and for other purposes," approved July 15, 1882, contracts were made as follows:

1. October 29, 1883, with Beckwith and Quackenbush, for construction of tunnel, to be completed June 30, 1885.

2. October 30, 1883, with Maloney and Gleason, for construction of reservoir, to be completed June 30, 1885.

3. November 7, 1883, with Chittenden Brothers, for construction of dam, to be completed June 30, 1885.

As will appear from the within communication from Major G. J. Lydecker, Corps of Engineers, the officer in charge of the work, with whom the contracts were made, neither of the above-mentioned contracts have been fulfilled, and for each of them application for an extension of time has been made by the contractors.

In regard to the contract of Beckwith and Quackenbush for constructing the tunnel, it may be said that the work is exceedingly difficult, and has been, under the circumstances, prosecuted with considerable vigor and energy, and it is believed, in justice to all parties, the contract should be extended to July 1, 1886, as recommended by Major Lydecker.

The contract with Maloney and Gleason for construction of the reservoir, depending upon the completion of the contract for the tunnel, may with propriety be extended to July 1, 1886, as recommended by Major Lydecker.

In reference to the contract of Messrs. Chittenden Brothers for the construction of

the dam at Great Falls, while Major Lydecker sees no valid reason for its not having been completed at the time specified (June 30, 1885), yet he recommends that it be extended to November 1, 1885.

The recommendations as above stated are concurred in by this office, but it is believed that the penalties, named by Major Lydecker as a condition to granting the extension of time, should not be imposed, for the reason that they do not appear to be in accordance with law, or with the requirements of the several contracts, unless these can be modified to admit the penalties.

The contracts referred to are herewith submitted; also a copy of the act.

Very respectfully your ob'd't serv't,

JOHN NEWTON,
Chief of Engineers, Brig. and Bv't Maj. Gen'l.

[1st indorsement.]

WAR DEP'T, *July* 6, 1885.

Approved.
By order of the Secretary of War.

JOHN TWEEDALE,
Chief Clerk.

[Committee No. 113.]

EE.—*Report of Board of Engineers on modifications of plan for new reservoir.*

WASHINGTON, D. C., *July* 24, 1885.

Proceedings of a Board of Engineers convened by the following order:

[Extract.]

SPECIAL ORDERS, }
No. 107. }

HEADQUARTERS CORPS OF ENGINEERS, }
UNITED STATES ARMY, }
Washington, D. C., July 15, 1885.

1. By direction of the Secretary of War, a board of officers of the Corps of Engineers, to consist of Colonel Thos. Lincoln Casey, Lt. Col. William P. Craighill, Major Garrett J. Lydecker, with Captain Thomas W. Symons as recorder, will assemble at the city of Washington, upon the call of the senior member, at the earliest time the duties of the members will permit, to take into consideration and report upon modifications in the plan of the reservoir now under construction for additional water supply to the cities of Washington and Georgetown.

Upon the completion of the duty assigned the Board, Lieutenant-Colonel Craighill will return to his station in Baltimore, Md.

The journeys required under this order are necessary for the public service.

The expenses of the Board will be paid by Major Garrett J. Lydecker, Corps of Engineers, from the appropriation for increasing the water supply of Washington, D. C.

JOHN M. WILSON,
Acting Chief of Engineers.

JULY 20, 1885.

Board met at 11 a. m., pursuant to call of senior member, at his office in the city of Washington.

Present, all the members and recorder.

The order convening Board and letter of transmittal to the senior member were read. A copy of the letter of transmittal is herewith.

The accompanying papers, consisting of Major Lydecker's letter to the Chief of Engineers, recommending a change of plan in the new reservoir and Capt. Symons's estimate of the cost thereof, were read.

The Board then adjourned to the office of the Washington Aqueduct and examined the maps and plans of the new reservoir and the auxiliary works connected therewith, and received explanations of the plans proposed for overcoming difficulties and completing the work as far as these plans have been developed.

A subcommittee of the Board, consisting of Lt. Col. Craighill and Major Lydecker, with the recorder, then visited the new reservoir and examined the work.

The entire board then re-assembled at the residence of the senior member, and after a full discussion of the questions submitted for consideration arrived at certain con-

clusions in relation thereto. Major Lydecker was requested to draw up a report embodying these conclusions, and the board, at 4 p. m., adjourned to meet at call of senior member.

JULY 24th, 1885.

Board met at 11 a. m., pursuant to call of senior member.

Present: All the members and the recorder.

Since the last meeting Col. Casey has visited the site of the work and examined it personally.

Major Lydecker submitted a report, which, with certain changes suggested by members of the board, was finally adopted, and is submitted herewith.

The board, having concluded its labors, then adjourned.

THOMAS W. SYMONS,
Captain of Engineers, U. S. A., Recorder.

[Committee No. 114.]

EE[2].—*Letter of the Chief of Engineers relative to report of Board of Engineers on modification of plan for new reservoir.*

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
Washington, D. C., July 15, '85.

Col. THOS. LINCOLN CASEY,
Corps of Engineers, Washington, D. C.:

SIR: The Board of Officers constituted by Special Orders, No. 107, Headquarters Corps of Engineers, July 15, 1885, is assembled to consider and report upon a plan submitted to this office June 29, ulto., by Major G. J. Lydecker, Corps of Engineers, in charge, modifying the one originally adopted for draining the lands adjacent to the reservoir now under construction by him.

In view of adverse criticisms that have appeared and of the importance of insuring the confidence of the community in the plans adopted for obtaining an additional water supply for the cities of Washington and Georgetown, the Board will give the whole subject of the storage and purity of the water supply the most careful consideration, and report such changes in the original or present modified plans for the reservoir as they may deem best adapted to attain the object in view.

Major Lydecker will furnish such additional information upon this subject as may be desired by the Board.

Very respectfully, your obed. serv't,

JOHN G. PARKE,
Acting Chief of Engineers.

[Committee No. 115.]

GG.—*Letter recommending calling attention of Congress to need of additional appropriation for tunnel.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., December 15, 1885.

Brig. Gen. JOHN NEWTON,
Chief of Engineers, U. S. A., Washington, D. C.:

GENERAL: My annual report for the year ending June 30, 1885, in relation to *increasing* the water supply of Washington, D. C., sets forth the pressing importance of an additional appropriation for continuing work on the tunnel extension of the aqueduct at the earliest possible date after the assembling of Congress. I have now the honor to recommend that the attention of Congress be called to this matter in a special communication, with an urgent request that the necessary provision be made in the immediate deficiency bill. If this is not done operations must be suspended very soon, the ultimate cost of the work will be largely increased, and the suffering incident to the present inadequate water supply be unnecessarily prolonged. The balance in hand available for the work at this date is only $21,696.34, while the average monthly expenditure since the beginning of the year has been $30,217.02, notwithstanding the fact that during the past five months operations have been conducted on the most limited scale consistent with the nature of the work, in order to prevent the present appropriation from being exhausted before Congress could have an opportunity to supplement it; the balance now in hand can not be made to hold

out beyond February 1st at the latest, and if more money is not appropriated by that time all work will have to be stopped; the tunnel will then fill with water, the result of which will be to entail much unnecessary expense in pumping it out and making other provisions for resuming operations whenever the means are finally provided; and, besides, it is impossible to foretell the extent of damage that may result in such parts of the tunnel as are not in hard, solid rock. I would, therefore, urge, with all permissible force, that the amount necessary for avoiding the expense and damage above indicated, and for a vigorous prosecution and speedy completion of the work (estimated at $395,000, as shown by detailed estimate herewith) be appropriated in the manner hereinbefore suggested.

I transmit herewith extracts from my annual report, in which are set forth at length the reasons why this important work can not be completed with the sum originally appropriated; it may be stated generally that under the most favorable conditions this sum might have been sufficient for completing the tunnel proper, if not for all the requisite auxiliaries and accessory work, but unfortunately the conditions developed during the progress of the work have not been of that kind.

The progress made to November 30th, 1885, is shown on the tracing transmitted herewith. The total length of tunnel when completed will be 20,715.8 feet; the length excavated to November 30th was 17,726.5, leaving 2,989.3 feet remaining to be excavated, all of which, except 340.5 feet, lies between the Champlain avenue working shaft and the terminal shaft near Howard University; it is between these points that we have thus far met the conditions most unfavorable to progress, and there appears to be no reason to anticipate any change in that respect.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 116.]

FF.—*Letter requesting that work under modified plan for new reservoir be proceeded with.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., August 4, 1885.

Brig. Gen. JOHN NEWTON,
Chief of Engineers, U. S. A., Washington, D. C.:

GENERAL: I have the honor to acknowledge the receipt of your letter of the 31st ult. informing me of the action taken in relation to the proposed modification of the new reservoir near Howard University, as recommended in my letter dated June 29th, 1885, and in the report of the Board of Engineers to which the subject was referred.

It is of the greatest importance that the plan on which the reservoir is to be completed should be determined at once, and I would therefore respectfully request that the matter be reconsidered so far as relates to submitting it for determination to the action of Congress for reasons stated below.

The further progress of the work must depend on the steps taken to divert the tributary streams from the site of the reservoir; if this is not done in pursuance of the modified plan as recommended, it must be on the original plan (which has been substantially condemned), *or* the contractors must make special arrangements to dispose of the water and sewage carried by these streams until a final plan is determined upon. The latter course would give rise to complications with the contractors and afford them valid grounds for claim for extra work, the extent of which I am not now able to determine. If neither of the courses above indicated be adopted it will be necessary to discontinue work on the reservoir, in which case also complications and claims against the United States would result.

It is believed that the suggestion of submitting the proposed modifications to Congress is based on a misapprehension of the facts. The *details* involved in the original plan for the reservoir were not submitted to Congress, but only a general scheme for increasing the water supply, which involved as one of its features the construction of a reservoir, the site of which was indicated, only in a general way, to be on the high ground north of Boundary and east of 7th street. At the time Congress took action no detailed survey or plan had been made and the only extent to which Congress has acted in this respect is by the act approved July 15th, 1882, directing the survey of the land necessary for a reservoir on the "high ground north of Washington, near 6th street extended," and authorizing and directing the Secretary of War to "construct at that point a reservoir of the capacity of not less than three hundred million gallons." In pursuance of the act above indicated the survey was duly made, and subsequently detailed plans and specifications for the work were prepared, which plans and specifications were transmitted with my project submitted July 14, 1883. This project was forwarded by the Chief of Engineers to the Secretary of War with

his approval, and was by the latter approved July 27, 1883. The work has been prosecuted since then solely with reference to these plans, approved as above. The specifications for the work which constitute a part of the contract reserves to the United States the right to modify them, and the modification now in question, which relates to certain details that have never been the subject of Congressional action, would not appear to call for any action by that body.

The above is respectfully submitted, with request that in the future progress of the work I may be authorized to proceed with the view to its completion on the modified plan as recommended in my letter of June 29, 1885.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[First indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
August 5, 1885.

Respectfully submitted to the Secretary of War.

In view of the circumstances detailed by Major Lydecker it is recommended that the modification of plan for the new reservoir as approved by the Board of Engineers be approved by the Secretary of War. The appropriation for this work was made by act of July 15, 1882, in accordance with an estimate furnished by the Engineer Commissioner of the District of Columbia direct to Congress, not through the War Department. It is now estimated that the reservoir will cost $150,000 more than the amount appropriated, of which $37,763.81 is for the modifications now recommended for approval. The plan now being executed under contract was approved by the Secretary of War July 27, 1883. The report of the Board of Engineers on the proposed modification of this plan with the indorsement of this office dated July 27, 1885, are herewith. A copy of Senate Report No. 242, Forty-seventh Congress, First session, showing what plans and estimates were before Congress when the appropriation of $466,523 was made, is also herewith.

The modifications in the plan of the reservoir now proposed pertain to details which have been approved by the Secretary of War since the appropriation for the work was made.

JOHN NEWTON,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

These modifications, proposed by the Board of Engineers, and concurred in by the Chief of Engineers, refer to the substitution of side-covered drains and surface drains for the iron pipe drains, as first proposed to lie on the bottom of the reservoir. The principal reason given for the change was, that any accident to the drainage system under the reservoir would involve emptying the reservoir in order to repair it. This is a substantial reason and justifies the modifications proposed.

From the communication of Major Lydecker, it is necessary either that the work should go on under the proposed new plan, or upon the old plan. He reports that the further progress of the work depends upon the recommendation of the Board of Engineers being carried into immediate effect, or that the old plan be adhered to, otherwise the contractors must make special arrangements to dispose of the water and sewage, which would give rise to complications with the contractors, and afford them valid ground for claim for extra work; and if neither be adopted then work on the reservoir must be discontinued, with the effect of causing further complications and claims against the United States.

It is therefore apparent that action should be had at the earliest possible moment.

JOHN NEWTON,
Chief of Engineers, and Brig. Bvt. Maj. Gen.

[Second indorsement.]

WAR DEPARTMENT,
Aug. 10, 1885.

Approved as recommended by the Chief of Engineers.

By order of the Secretary of War.

JAY STONE,
Act'g. Chief Clerk.

[Committee No. 117.]

HH.—*Indorsement to appeal of Maloney & Gleason to the Secretary of War, etc.*

[Third indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
June 1, 1886.

Respectfully returned to the Secretary of War, inviting attention to the report of Major G. J. Lydecker, Corps of Engineers, transmitted herewith.

JOHN G. PARKE,
Act'g Chief of Engineers.

[Committee No. 118.]

HH[1].—*Report of Maj. G. J. Lydecker on claim of Maloney & Gleason.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., May 24, 1886.

Brig. Gen. JOHN NEWTON,
Chief of Engineers, U. S. A., Washington, D. C.:

GENERAL: I have the honor to submit the following report in relation to certain claims filed March 22, 1886, by Maloney & Gleason, by E. John Ellis, att'y, for extra work performed under their contract for constructing the new reservoir for the Washington water supply.

Upon receiving the papers, I immediately caused to be undertaken an examination as to each item in the bill of charges, which examination was only completed a few days since, for the reason that it included, practically, an examination of all original field notes and computations for estimates since the beginning of the work. The result of this examination may be summarized as follows:

1st. There are 42 items in the bill of charges, aggregating $77,516.15.

2d. Items 1 to 41, inclusive, aggregate $7,516.15, of which the sum of $2,761.28 appears to have been allowed in the several monthly estimates; the remainder ($4,754.37) may be subdivided into classes, as follows:

(*a*) Items claimed by the contractors as "extra work," but not so regarded or admitted by the officers in charge of the work;

(*b*) A few small items that might properly be classed as extra work, but for which no written order was given or no claim presented in writing at the time as imperatively required by the contract;

(*c*) Items of which those in charge of the work have no record or knowledge, and which appear to be purely imaginary; and

(*d*) Items which may possibly involve some errors of estimate, but which will be adjusted and allowed if found due on final measurement. Item 41 is included in this class, but an approximate re-estimate fails to show anything like such a deficiency as is claimed by the contractors.

3d. Item 42 claims $70,000 for puddling the body of the dam, and this claim is, in our estimation, simply preposterous; its rests solely on the fact that at certain times a few watering-carts were employed to sprinkle the earth, which they chose to deposit on the dam, when it was so dry and powdery that without so doing the contractors could not have made "*next to the water in the reservoir an ample mass of water-resisting material thoroughly compacted*," as required by the specifications; if they had not sprinkled this earth in the way they did they would have been required to select suitable material for the purpose from the other parts of the excavation, a course that would have been vastly more costly to them. In respect to this work they did nothing that was not expressed or implied in the contract which required them to carry it on "*with the utmost vigor*," and make it "*the best of its kind, satisfactory in every respect to the United States Engineer.*"

I do not consider it necessary to enter upon an argument in refutation of the extended remarks and reflections contained in the paper submitted by the attorney for the contractors; indeed, it would appear more to the interests of the United States to reserve all argument in defense of claims that seem likely to be preferred by the contractors until they are brought to a hearing before the tribunal provided by law for the determination of such claims.

In the performance of the responsible duties devolved upon me by the contract it has been my constant aim to deal with the contractors as liberally as the requirements of the

contract would admit; and I am satisfied that if I have erred in any direction it has been in not holding them up to a strict compliance with what they were required to do.

The papers in this case referred to me for report on the 9th of April, 1886, are returned herewith.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. Army.

[Committee No. 119.]

II.—*Letter submitting project for expenditure of* $5,000 *on Washington Aqueduct.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., April 6, 1886.

Brig. Gen. JOHN NEWTON,
Chief of Engineers, U. S. A., Washington, D. C.:

GENERAL: In pursuance of instructions contained in Department letter dated April 5, 1886, I have the honor to submit the following project for the application of the sum of $5,000 appropriated by the urgent deficiency bill, approved March 26, 1886, to preserve from flooding or other injury, the tunnel now being constructed for the water supply of Washington, D. C., during the suspension of operations thereon.

To this end it is proposed to continue the course followed since the 1st of February last, the date at which active work on the tunnel was suspended, viz: by pumping at the several shafts to prevent the tunnel filling with water, which work is being done by the contractors at a compensation of $35 per day. It is also proposed to apply the sum of $200 per month to continuing the pay of George H. Coryell, the assistant engineer, who has been in immediate charge of operations on the tunnel almost from the beginning. On this basis the sum appropriated will serve to preserve the tunnel from flooding or incidental injury of a minor character until the close of the current fiscal year. In the meantime there will be a growing liability of considerable falls of rock, but nothing can be done to meet this difficulty until a new appropriation affords the means for resuming the work of excavation and lining.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[First indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
April 7, 1886.

Respectfully submitted to the Secretary of War for his information, and with recommendation for approval.

JOHN G. PARKE,
Acting Chief of Engineers.

[Second indorsement.]

WAR DEPARTMENT,
April 13, 1886.

The recommendation of the Acting Chief of Engineers is approved.

By order of the Secretary of War.

JOHN TWEEDALE,
Chief Clerk.

[Third indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
April 17, 1886.

Respectfully returned to Major G. J. Lydecker, Corps of Engineers, inviting attention to the foregoing indorsement, by which he will be guided.

When such record has been made as may be required for his office Major Lydecker will return this paper to this office.

By command of Brig. Gen. Newton.

JOHN G. PARK,
Colonel of Engineers, Bvt. Maj. Gen., U. S. A.

[Fourth indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, April 19, 1886.

Respectfully returned to the Chief of Engineers, U. S. A., record of approval having been made in this office.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 120.]

HH[2].—*Letter of the Secretary of War to Hon. E. John Ellis, attorney, on claim for extra work on reservoir)*

WAR DEPARTMENT,
Washington City, June 5, 1886.

Hon. E. JOHN ELLIS, *Attorney, Washington, D. C.:*

SIR: I have the honor to acknowledge receipt of your communication of March 26, 1886, forwarding the claim, stated at $77,516.75, of Maloney and Gleason, for compensation for extra work under their contract for construction of the new reservoir for the Washington water supply. In reply I beg to inform you that after a careful examination of the papers in the claim, I am convinced that the questions involved are those which should be settled by the court rather than this Department.

Claimant's remedy may be sought by petition to the Court of Claims, under section 1059 of the Revised Statutes.

Very respectfully,

WM. C. ENDICOTT,
Secretary of War.

[Committee No. 121.]

A[1].—*Papers in the Office of the Chief of Engineers, copies of which have not been furnished to the Joint Committee on the Washington Aqueduct Extension on account of want of time, or probable irrelevancy to the issue, but which, if in any case desired, can be furnished upon sufficient notice.*

[The figures indicate the office marks.]

1959 R. & H., 1882. July 14, 1882. Secretary of War returns to the President (Senate 1723) act to increase water supply of Washington. No objection to its approval.

2257 R. & H., 1883. August 1, 1883. Major Lydecker reports completion of surveys to increase water supply, &c., showing lands required for the work, and recommends the usual action be taken by the Attorney-General.

2465 R. & H., 1883. August 23, 1883. Major Lydecker to Chief Clerk War Department, requesting permission to publish certain advertisements for proposals under act of July 15, 1882.

2805 R. & H., 1883. October 4, 1883. Major Lydecker transmits contracts and bonds for furnishing cast-iron water pipes, &c., West Point Foundry and A. H. McNeal.

2909 R. & H., 1883. October 13, 1883. Major Lydecker returns above completed, as requested by letter of October 6, 1883.

3030 R. & H., 1883. November 3, 1883. Major Lydecker transmits contracts and bonds of Maloney & Gleason for building reservoir.

3062 R. & H., 1883. November 7, 1883. Major Lydecker transmits contract and bond of Chittenden Brothers for construction of dam.

2858 R. & H., 1884. August 22, 1884. Commissioners of the District of Columbia request estimate of the amount required for Washington Aqueduct for year ending June 30, 1886.

4183 R. & H., 1884. October 24, 1884. First Comptroller requests Major Lydecker be directed to deposit copies of contracts, &c., in his office; one inclosure being letter from Acting Secretary of War to First Comptroller concerning same.

45 R. & H., 1884. January 4, 1884. Department of Justice asks for certain information concerning land referred to in 2257 R. & H., 1883, above; one inclosure, Secretary of War to Attorney-General giving the information.

615 R. & H., 1884. February 26, 1884. Department of Justice gives opinion on re-advertising for condemnation of more land for reservoir; one inclosure, letter of Secretary of War to Attorney-General about same.

622 R. & H., 1884. March 1, 1884. Major Lydecker requests authority to sell old houses on condemned land.

921 R. & H., 1884. March 24, 1884. Department of Justice refers request of B. H. Warner, secretary of board of appraisers, for profile of extension of Aqueduct; two inclosures, Secretary of War to Warner, Secretary of War to Attorney-General.

1025 R. & H., 1884. April 5, 1884. House Committee on Appropriations asks as to time of completion of extension of water supply.

1260 H. & R., 1884. May 6, 1884. Secretary of War to Attorney-General, with reference to appraisers of land for Aqueduct extension.

3140 R. & H., 1884. September 3, 1884. Department of Justice transmits approved accounts of appraisers of land for personal services.

2052 R. & H. 1884. July 18, 1884. Department of Justice requests description by meters and bounds of land at Great Falls, &c. One inclosure, 2522 R. & H., 1884, Major Lydecker submits maps and descriptions required.

2650 R. & H., 1885. September 7, 1885. Major Lydecker forwards a copy (tracing) of detailed plan for reservoir, as requested by Department letter of July 8, 1885.

2083 R. & H., 1883. April 14, 1883. Chief of Engineers submits to Secretary of War plats and description of certain lands for Aqueduct extension and requests action of Attorney-General. One inclosure, letter of Secretary of War to Attorney-General concerning same.

2084 R. & H., 1883. July 6, 1883. Department of Justice gives opinion upon certain questions relative to extension of Washington Aqueduct.

2994 R. & H., 1883. October 25, 1883. Department of Justice requests information on questions of valuation and damages of land taken for Washington Aqueduct extension.

3156 R. & H., 1883. November 17, 1883. Major Lydecker transmits contract, &c., with Beckwith & Quackenbush for construction of tunnel, &c.

$\frac{321}{111}$ 1886. June 7, 1886, Department of Justice transmits account of A. S. Worthington, U. S. attorney, for services, &c.

$\frac{494}{111}$ 1886. June 26, 1886. Department of Justice calls for evidence in the case of Helen R. Tindall *vs.* the United States.

$\frac{495}{111}$ 1886. Department of Justice calls for evidence in case of Martin L. Noerr *vs.* the United States.

$\frac{856}{111}$ 1886. August 9, 1886. Correspondence with the engineer commissioner of the District of Columbia in regard to connecting new 48-inch main with the city mains.

932 R. & H., 1886. April 7, 1886. Hon. W. L. Wilson, chairman sub committee on Appropriations in reference to obtaining views of certain officers of the Corps of Engineers upon criticism of Capt. R. L. Hoxie upon plans for extension of Washington Aqueduct.

952 R. & H., 1886. April 20, 1886. Hon. W. L. Wilson, requesting letter of Captain Hoxie to Hon. S. J. Randall.

992 R. & H., 1886. April 22, 1886. Maj. Wm. Ludlow reports conference with House Committee on Appropriations, &c.

979 R. & H., 1886. April 21, 1886. Major Lydecker transmits reply to Captain Hoxie's letter and Hon. S. J. Randall, &c. One inclosure. Letter of Chief of Engineers to Secretary of War, submitting above.

1046 R. & H., 1886. April 28, 1886. House Committee on Appropriations telegraphs whether Captain Hoxie has been ordered to appear before committee. One inclosure. Answer of War Department.

$\frac{754}{IV}$ 1887. February 23, 1887. House Committee on Appropriations asks how much of appropriation of $395,000, act of March 4, 1886, has been expended.

$\frac{547}{III}$ 1887. February 3, 1887. Commissioners of District of Columbia request use and control of 48-inch main, &c.

$\frac{2419}{IV}$ 1887. April 28, 1887. Chittenden Brothers request suspension of final action on their claim for extra work.

$\frac{2720}{III}$ 1887. July 18, 1887. Commissioners of District of Columbia request certain water mains to be turned over for use of the city.

$\frac{2813}{III}$ 1887. July 26, 1887. Col. J. M. Wilson, in charge of public buildings and grounds, requests protection to a spring near Soldiers' Home.

$\frac{3461}{IV}$ 1887. September 27, 1887. R. H. Thayer, attorney, submits brief in claim of Chittenden Brothers, for extra work, material, &c.

$\frac{60}{C}$ 1888. December 30, 1887. Chief of Engineers to Major Lydecker, requesting amounts under each act respectively from which estimate of funds for $78,279.51 is required.

$\frac{266}{B}$ 1888. January 23, 1888. House Committee on Appropriations asks, by telegraph, that an officer be designated to meet subcommittee to explain certain items in deficiency bill.

$\frac{730, 1445, 2594}{C}$ 1888. March 9, 1888. Papers in relation to Maloney & Gleason's claim for extra work, &c.

$\frac{995, 2501}{A \quad B}$ 1888. March 12, 1888, and May 5, 1888. Senate Claims Committee in relation to claim of Alice E. and T. R. B. De Groot.

$\frac{1093}{B}$ 1888. March 29, 1888. Major Lydecker calls attention to impossibility of complying with provision in last deficiency bill to complete Washington aqueduct extension by November 1, next.

$\frac{4028}{B}$ 1888. October 2, 1888. Major Lydecker requests that provision be made to keep tunnel clear of water when work stops by legal limitation.

$\frac{4008}{A}$ 1888. October 17, 1888. The President refers for remark of Secretary of War, Senate resolution 116, Fiftieth Congress, first session, joint resolution to protect Washington aqueduct tunnel, &c.

$\frac{3975}{A}$ 1888. October 15, 1888. House Committee on Appropriations asks, by telegraph, as to decision of Comptroller about limitation of appropriation for Washington aqueduct.

$\frac{4154}{A}$ 1888. October 25, 1888. Opinion of Attorney-General that Secretary of War can extend time of completing Washington Aqueduct.

[Committee No. 122.]

JJ[1].—*Major Lydecker's report on appropriation, expenditures, employés, and laws, Washington aqueduct and extension.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., April 5, 1886.

GENERAL: I have the honor to report as follows in answer to the several questions submitted by the Hon. Samuel J. Randall in his letter of April 2d, 1886, requesting information in relation to the Washington aqueduct and its extension:

1. The aggregate amount of appropriations to date on account of the construction and extension of the Washington aqueduct is $5,590,436.30.

2. The portion of the foregoing sum charged wholly to the United States Treasury was $4,680,296.65.

3. So far as I can ascertain from the records of this office, which do not include the U. S. Statutes at Large, the construction of the Washington aqueduct was commenced in pursuance of authority contained in the general appropriation act approved March 3d, 1853, wherein the sum of $100,000 was appropriated for the work. (U. S. Statutes at Large, vol. 10, p. 206.) Since that time the work has been continued under appropriations indicated on Statement A, hereto annexed. The extension of the aqueduct was authorized by the act entitled "An act to increase the water supply of the city of Washington, and for other purposes," approved July 15, 1882.

4. The amount expended for maintenance and current expenses of the Washington aqueduct for the fiscal year 1885 was $20,000, being the amount appropriated in the act making appropriations for the support of the District of Columbia, approved July 5, 1884, the items being as follows: Washington aqueduct, for engineering, maintenance, and general repairs, $20,000.

5. The number of persons now employed on the Washington aqueduct and the work of increasing the water supply is 33, as specified on Statement B, annexed hereto.

The expressions "Washington aqueduct" "or its extension" are to be understood in this communication to include all the works accessory to the aqueduct proper, such as the dam at the Great Falls, the several reservoirs, gate-houses, conduit-road, &c.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

Brig. Gen. JOHN NEWTON,
Chief of Engineers, U. S. A., Washington, D. C.

STATEMENT A.—*List of appropriations on account of the Washington aqueduct and extension thereof.*

Act of—	Appropriations.	Act of—	Appropriations.
September 30, 1850	$500.00	June 23, 1874	(d)$30,400.00
August 31, 1852	(a)5,000.00	March 3, 1875	26,000.00
March 3, 1853	100,000.00	July 31, 1876	22,000.00
March 3, 1855	250,000.00	March 3, 1877	15,000.00
August 18, 1856	250,000.00	July 20, 1878	15,000.00
March 3, 1857	1,000,000.00	March 3, 1879	(e)20,000.00
June 12, 1858	800,000.00	June 4, 1880	(f)20,000.00
June 25, 1860	500,000.00	March 3, 1881	20,000.00
July 4, 1864	150,000.00	July 1, 1882	(g)20,000.00
July 28, 1866	142,584.00	July 15, 1882	*1,485,279.30
December 20, 1866	12,000.00	March 3, 1883	20,000.00
March 2, 1867	20,000.00	July 5, 1884	20,000.00
July 25, 1868	52,500.00	July 7, 1884	†87,500.00
March 3, 1869	25,000.00	February 25, 1885	20,000.00
July 15, 1870	(b)150,822.00	March 3, 1885	†87,500.00
March 3, 1871	114,196.00	March, 1886	*5,000.00
June 10, 1872	70,555.00		
January 23, 1873	14,000.00	Total appropriations	5,590,436.30
March 3, 1873	(c)43,600.00		

*Extension. †Extension (for land).

Total appropriation for "Washington aqueduct"	$3,925,157.00
"Increasing water supply of Washington, D. C."	1,665,279.30
	5,590,436.30

Amounts reverted to the United States Treasury.

(a)	$2.81	(f)	$381.06
(b)	46.25	(g)	1,354.17
(c)	560.87		
(d)	.35	Total	3,455.38
(e)	1,109.87		

Since 1878 one-half of the appropriations above indicated have been contributed by the United States and the other half by the District of Columbia.

STATEMENT B.—*List of officers and employés connected with the Washington aqueduct and the work of increasing the water supply of Washington, D. C., on April* 1, 1886, *and their compensation.*

1 major of engineers, U. S. A. (a)	p. m.	$291.67	1 rodman (b)	p. m.	$60.00
1 captain of engineers, U. S. A. (a)	do	216.67	1 clerk (c)	do	60.00
1 chief clerk (b)	do	200.00	1 messenger (c)	do	60.00
2 assistant engineers (b), each	do	200.00	5 watchmen (c), each	do	60.00
1 overseer (c)	do	150.00	1 chainman (b)	do	40.00
1 inspector (b)	do	150.00	1 laborer (c)	do	40.00
1 inspector (b)	do	125.00	1 laborer (c)	do	25.00
1 draughtsman (b)	do	120.00	1 messenger (b)	do	10.00
2 inspectors (b), each	do	100.00	1 watchman (b)	do	7.50
1 copyist (b)	do	100.00	1 carpenter (c)	p. d.	3.00
1 leveler (b)	do	100.00	6 laborers (c), each	do	1.25

Paid from appropriation for:

(a) "Pay of the Army."
(b) "Increasing the water supply of Washington, D. C."
(c) "Washington aqueduct."

[Committee No. 123.]

JJ.—*Letter of chairman of House Committee on Appropriations requesting information as to appropriation, expenditure, employés, and laws, Washington aqueduct and extension.*

HOUSE OF REPRESENTATIVES,
Washington, D. C., April 2, 1886.

Hon. W. C. ENDICOTT,
Secretary of War:

SIR: I have the honor to request that you will cause to be furnished for the use of the Committee on Appropriations the following information:

What is the aggregate amount of appropriations to date, payable in whole or in part from the Treasury of the United States on account of the construction of the Washington aqueduct and water-works, including the extension thereof?

What portion of the foregoing sum was charged wholly to the United States Treasury?

Give reference by title, number of volume, and page of the Statutes at Large, to the laws authorizing the construction of the Washington aqueduct and water-works and the extensions thereof.

What amount was expended during the fiscal year 1885 for maintenance and current expenses of the Washington aqueduct and water-works, and from what appropriation was the same paid?

What number of persons are now employed in connection with the Washington aqueduct and water-works and the extension thereof (exclusive of the contractors or employés paid by them), including Army officers and the compensation, per diem, monthly, or annual, paid to them?

The foregoing information is desired by the committee at the earliest practicable moment.

Very respectfully,

SAM. J. RANDALL,
Chairman Committee on Appropriations, H. of R.

[First indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
April 2, 1886.

Respectfully referred to Maj. G. J. Lydecker for report at the earliest possible moment.
By command of the Acting Chief of Engineers.

H. M. ADAMS,
Capt. of Engineers.

[Second Indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, April 5, 1886.

Respectfully returned to the Chief of Engineers, U. S. A., with report inclosed.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Third indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
April 6, 1886.

Respectfully returned to the Secretary of War. The inclosed report of Major G. J. Lydecker furnishes the information desired by Mr. Randall except the references to volume and page of Statutes at Large giving laws authorizing the construction of Washington aqueduct. The laws with references will be found in the two pamphlets herewith.

JOHN G. PARKE,
Acting Chief of Engineers.

[Committee No. 124.]

JJ[2].—*Letter of Secretary of War transmitting Major Lydecker's report.*

WAR DEPARTMENT,
Washington City, April 7, 1886.

SIR: I have the honor to acknowledge the receipt of your letter of the 2d instant requesting, for the use of the Committee on Appropriations, information as to the amount of appropriations to date, payable in whole or in part from the United States Treasury,

on account of the construction of the Washington aqueduct, including the extension thereof, and the number of persons now employed on the work, exclusive of contractors or employés paid by them, and including army officers and the compensation paid them.

In reply, I beg to invite attention to the report of the 5th instant from Major G. J. Lydecker, the printed report on the Washington aqueduct for the year ending September 30, 1871, by Major George H. Elliott, and the pamphlet containing the acts of Congress relating to the Washington aqueduct since July 20, 1871, all included herewith, which will afford the information requested.

Very respectfully, your obedient servant,

WM. C. ENDICOTT,
Secretary of War.

Hon. SAMUEL J. RANDALL,
Chairman Committee on Appropriations, House of Representatives.

[Committee No. 125.]

KK.—*Letter of Chief of Engineers calling for project for expenditure of funds to prevent flooding in tunnel.*

OFFICE OF THE CHIEF OF ENGINEERS, UNITED STATES ARMY,
Washington, D. C., April 5, 1886.

Major G. J. LYDECKER,
Corps of Engineers, Washington, D. C.:

SIR: "An act to provide for certain of the most urgent deficiencies in the appropriation for the service of the Government for the fiscal year ending June thirtieth, eighteen hundred and eighty-six, and for other purposes," approved March 26, 1886, contains the following item:

"WATER SUPPLY, DISTRICT OF COLUMBIA.

"The sum of five thousand dollars, or so much thereof as may be necessary, to enable the Secretary of War to preserve from flooding or other injury, during the suspension of operations thereon, the tunnel now being constructed under authority of an act to increase the water supply of Washington City, and for other purposes, approved July fifteenth, eighteen hundred and eighty-two, the said sum to be subject to all the provisions and restrictions of said act, and of the act approved July fifth, eighteen hundred and eighty-four, making appropriations for the expenses of the government of the District of Columbia, as to its apportionment and settlement between the United States and the District of Columbia, and the refunding thereof."

You will please submit to this office a project for the application of the above sum, showing how it is proposed to apply the money to the object for which the appropriation is made.

Very respectfully, your obedient servant,

JOHN G. PARKE,
Acting Chief of Engineers.

[Committee No. 126.]

LL.—*Major Lydecker requesting authority to employ an assistant engineer on reservoir at $175 per month.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., May 18, 1886.

GENERAL: I have the honor to apply for authority to employ an assistant engineer, at a compensation of $175 per month, for duty in connection with the work of constructing the new reservoir near Howard University.

I find it of the highest importance, in compiling the record of work done, to remeasure and compute the quantities, not only to make a more perfect record, but as a check on the measurements already made. The contract under which operations are now being carried on will expire on the 30th of June, 1886, and I regard it as highly probable that the contractors, when final settlement is made with them, may present claims for extra

work, and dispute the measurements on which settlement is based. I consider it important to the protection of the interests of the United States to take the precaution contemplated by the employment of the additional assistant.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

Brig. Gen. JOHN NEWTON,
Chief of Engineers, U. S. A., Washington, D. C.

[Committee No. 127].

LL¹.—*Letter of Chief of Engineers to Major Lydecker relative to application for authority to employ assistant engineer.*

OFFICE OF THE CHIEF OF ENGINEERS, UNITED STATES ARMY,
Washington, D. C., May 21, 1886.

SIR: Your letter of the 18th inst., requesting authority to employ an assistant engineer at a compensation of $175 per month, for duty in connection with the work of constructing the new reservoir near Howard University, has been received.

The Chief of Engineers desires to be informed whether, with the present force, the measurements you desire can not be made in time to be available for such needs as you refer to. The reason for this inquiry is the extent of your present contingent roll.

By command of Brig. Gen. Newton.

Very respectfully, your obt. servant,

JOHN G. PARKE,
Colonel of Engineers, Bvt. Maj. Gen., U. S. A.

Maj. G. J. LYDECKER,
Corps of Engineers, Washington, D. C.

[1st indorsement].

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, May 24, 1886.

Respectfully returned to the Chief of Engineers, U. S. A. It will be impossible for me to accomplish the desired object without employing an additional assistant engineer, reliable and expert in the necessary instrumental work and computations. Previous measurements have been made by the supervising assistant engineer, Mr. J. A. Partridge, but he can not possibly take the necessary time from his duties of supervision to make the new measurements and computations. Besides, one of the important points in view is to *check his work* before final settlement with the contractors, who dispute the accuracy of the present measurements.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 128.]

MM.—*Letter of Maloney & Gleason, requesting extension of time for reservoir.*

WASHINGTON, D. C., *June* 28, 1886.

SIR: We would respectfully call your attention to the expiration of our contract with the Government for the construction of the new Washington reservoir on July 1, 1886, and ask that the same be extended for one year. Various exigencies have arisen to prevent our completion of this work, and to the inclemency of the weather is mainly attributable our failure, the excessive rainfall interfering with our designs most seriously, the basin being flooded some half dozen times this spring. Again, it would be impossible to complete the reservoir, on account of material for tunnel being in our way. Regretting the circumstances which compel us to ask this extension, and trusting our petition may meet with your approval, we remain,

Very respectfully,

MALONEY & GLEASON.

Maj. G. J. LYDECKER,
Corps of Engineers, U. S. A.

[First indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, June 28, 1886.

Respectfully forwarded to the Chief of Engineers, U. S. A.

Under the original contract this work was to have been completed by June 30th, 1885; the time for completion was extended one year, to June 30th, 1886. The failure to complete on time (so far as possible under the present appropriation) is, in my opinion, wholly due to a lack of vigor in the prosecution of the work, and in no sense to the violence of the elements or any emergency beyond the control of the contractors. For this reason I am not authorized by the terms of the contract to make the additional extension of time herein requested.

The balance of funds available for the "construction of reservoir and *gate-house*" at the close of the month will be about $30,000. Of this amount $20,000 should be reserved for the gate-house, leaving only about $10,000 available for work on the reservoir under the present appropriation. An estimate for an additional appropriation of $160,000 is now before Congress, and the proper steps to be taken for the completion of the work, after the present appropriation is exhausted, must depend, to some extent, on the action taken by that body. I would, therefore, recommend that the contract with Maloney and Gleason be extended to July 31st, 1886, only, by which time the sum now available for work on the reservoir will probably be exhausted, and action by Congress in relation to the additional appropriation may have been taken.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Second indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
June 30, 1886.

Respectfully submitted to the Secretary of War. It is recommended that the contract be extended to July 31, 1886, as proposed by Major Lydecker.

JOHN NEWTON,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

[Third indorsement.]

WAR DEPARTMENT,
July 1, 1886.

The recommendation of the Chief of Engineers is approved.
By order of the Secretary of War.

JOHN TWEEDALE,
Chief Clerk.

[Committee No. 129.]

MM[1].—*Announcement of approval of application for extension of time to Maloney & Gleason.*

OFFICE OF THE CHIEF OF ENGINEERS, UNITED STATES ARMY,
Washington, D. C., July 7th, 1886.

SIR: The letter of Maloney & Gleason of 28th ultimo, requesting extension of time for one year from July 1, 1886, for completing their contract for construction of reservoir, forwarded to this office by your indorsement of same date, having been submitted to the Secretary of War with recommendation that the contract be extended to July 31, 1886, as proposed by Major Lydecker, has been returned approved.

By command of the Acting Chief of Engineers.

Very respectfully, your obedient servant,

H. M. ADAMS,
Captain of Engineers.

Major G. J. LYDECKER,
Corps of Engineers, Washington, D. C.

[Committee No. 130.]

NN.—*Major Lydecker requesting authority to employ supervising inspector of masonry in tunnel.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., November 5, 1886.

GENERAL: I have the honor to apply for authority to employ one supervising inspector of masonry on the Washington Aqueduct tunnel, at a salary of $175 per month. I deem it of the greatest importance that the work of lining this tunnel (which is now about to commence) shall be under the constant supervision of a thoroughly reliable masonry expert, one who has had large experience with contractors, and who is known to be honest and competent.

The assistant engineer in immediate charge of the work can not give the necessary personal supervision to the lining work and in addition carry his lines for tunnel excavation and make his measurements and computations of work done.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

Brig. General JAMES C. DUANE,
Chief of Engineers, U. S. A., Washington, D. C.

[Committee No. 131.]

NN[1].—*Letter gra t ng authority to Major Lydecker to employ supervising inspector of masonry in tunnel.*

OFFICE OF THE CHIEF OF ENGINEERS, UNITED STATES ARMY,
Washington, D. C., November 10th, 1886.

Major G. J. LYDECKER,
Corps of Engineers, Washington, D. C.:

SIR: For the reasons given in your letter of the 5th instant, authority is hereby granted for the employment of a supervising inspector of masonry on the Washington Aqueduct tunnel, at a compensation not to exceed $175 per month, for such period as his services may be indispensable.

By command of Brig. Gen. Duane.

Very respectfully, your obedient servant,

JOHN G. PARKE,
Colonel of Engineers, Brt. Maj. Gen., U. S. A.

[Committee No. 132.]

OO.—*Letter calling for project for expending money appropriated by act of August* 4, 1886.

AUGUST 9, 1886.

SIR: The act making appropriations to supply the deficiencies in the appropriations for the fiscal year ending June thirtieth, eighteen hundred and eighty-six, etc., etc., approved August 4, 1886, under the heading "Increase of Water Supply, Washington, District of Columbia," makes provision for completing the tunnel and reservoir, and directs that certain questions connected therewith be submitted to the Board of Engineers for Fortifications and for River and Harbor Improvements (copy of the act herewith).

A copy of the letter to the Secretary of War in reference to the questions to be submitted to the board, as provided for in the act, is herewith for your information.

In connection with this subject your attention is invited to the proviso on page eleven in reference to proceeding upon such parts of the work as the Secretary of War shall direct pending the examination to be made by the board.

You will please submit a project for the application of the whole amount appropriated, as well as for such parts of the work as in your judgment may properly be carried on pending action upon the report of the board.

By command of Brig. Gen. Newton.

Very respectfully, your obt. servt.,

JOHN G. PARKE,
Colonel of Engineers, Brt. Major Gen., U. S. A.

Major J. G. LYDECKER,
Corps of Engineers, Georgetown Station, Washington, D. C.

[Committee No. 133.]

P P.—*Letter recommending a board to consider certain matters in connection with tunnel and reservoir.*

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., August 9, 1886.

Hon. WM. C. ENDICOTT,
Secretary of War:

SIR: The act making appropriations to supply deficiencies, &c., approved August 4, 1886, under the heading "Increase of water supply, Washington, District of Columbia," after making appropriations for completing the work, directs that certain questions in connection with the tunnel and reservoir be submitted to the Board of Engineers for Fortifications and for River and Harbor Improvements, for investigation and report (pages 10 and 11 of copy of act herewith).

It is recommended that the Board be directed to convene in this city for the above purpose at the earliest day practicable.

If the above meets approval the requisite orders and instructions will be issued from this office. A copy of the act will also be furnished Maj. G. J. Lydecker, Corps of Engineers, with instructions to submit a project for the application of the money appropriated, with his recommendation as to the manner in which it is to be applied under the law. He will also be instructed to furnish the Board with all information in his possession touching the question submitted to the Board, and every facility that the members may deem necessary to enable them to fully understand the subject committed to them.

Very respectfully, your obedient servant,

JOHN NEWTON,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

[1st indorsement.]

WAR DEPARTMENT,
August 11, 1886.

Approved.
By order of the Secretary of War.

JOHN TWEEDALE,
Chief Clerk.

[Committee No. 134.]

QQ.—*Letter in relation to extension of time to Beckwith & Quackenbush on tunnel.*

AUGUST 18, 1886.

Major G. J. LYDECKER,
Corps of Engineers, Washington, D. C.:

SIR: The following endorsements on the letter of Beckwith and Quackenbush of June 24, 1886, requesting an extension of time to June 30, 1887, for the completion of their contract for Washington Aqueduct tunnel, transmitted to this office by your indorsement of June 25, 1886, submitted with your letter of August 11 to the Secretary of War, are sent for your information.

[4th indorsement.]

"OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
"*Aug.* 12, 1886.

"Respectfully returned to the Secretary of War. Attention is invited to the inclosed letter submitted by Major Lydecker, and to the provisions of the deficiency act approved Aug. 4, 1886. Major Lydecker's views and his proposition for continuing the work are recommended for approval, the contract with Messrs. Beckwith & Quackenbush to be extended to June 30, 1887.

"JOHN NEWTON,
"*Chief of Engineers, Brig. and Bvt. Maj. Gen.*

[Fifth indorsement.]

"WAR DEPARTMENT,
"*August* 17, 1886.

"Approved as recommended by the Chief of Engineers.
"By order of the Secretary of War.

"SAM'L HODGKINS,
"*Acting Chief Clerk.*

"By command of the Acting Chief of Engineers.
"Very respectfully, your obedient servant,

"H. M. ADAMS,
"*Captain of Engineers.*"

[Committee No. 135.]

RR.—*Maloney & Gleason asking for extension of time.*

NEW RESERVOIR OFFICE,
Washington, D. C., Decem. 16, 1886.

SIR: Noting the fact that our present contract expires December 31, 1886, we would respectfully ask that the same be extended to such a time as may in your judgment seem proper.

The very unseasonable weather, together with a short season and numerous delays, causes us to make this request.

Very respectfully,

MALONEY & GLEASON.

To Maj. G. J. LYDECKER,
Corps of Engineers, U. S. A., Aqueduct Office, Georgetown, D. C.

[1st indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, January 19, 1887.

Respectfully forwarded to the Chief of Engineers, U. S. A. This application is for a further extension of the contract for constructing the new reservoir for the local water supply, made in October, 1883, and calling for the completion of the work by June 30th, 1885; the time was extended to June 30th, 1886, and finally to December 31st, 1886, pursuant to recommendations contained in my letter to the Chief of Engineers, dated August 16th, 1886. I then stated that "the contractors had at no time carried on the work with that degree of vigor and such extensive plant and working force as were called for by their contract;" there has been no improvement in these respects during the period covered by the last extension, but I recommend, nevertheless, that the contract be still further extended to June 30th, 1887, because I do not think that new contractors can be put on the work in its present condition with any advantage to the Government.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 136.]

RR[1].—*Letter granting extension of time to Maloney & Gleason.*

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., Jan'y 22d, 1887.

Maj. G. J. LYDECKER,
Corps of Engineers, Washington, D. C.:

SIR: Your recommendation of 19th inst. that the time for the completion of the contract of Maloney and Gleason for construction of reservoir for increasing the water supply of Washington, D. C., be extended to June 30, 1887, is approved.

By command of Maj. Gen. Duane.

Very respectfully,

H. M. ADAMS,
Captain of Engineers.

[Committee No. 137.]

88.—*Major Lydecker submitting estimates for completion of tunnel, etc.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., January 20, 1887.

Brig. General JAMES C. DUANE,
Chief of Engineers, U. S. A., Washington, D. C.:

GENERAL: At the time when I prepared the last annual report on the works in my charge the conditions were such that I could not present a reliable estimate of the amounts required to complete two of them, viz: 1st, the tunnel for increasing the water supply of Washington, D. C.; and 2d, the fishways at the Great Falls of the Potomac. I have now the honor to report that the sums required for these purposes will be, for the tunnel one hundred and seventy-five thousand (175,000) dollars, and for the fishways twenty-five thousand (25,000) dollars; and I respectfully recommend that Congress be requested to include those amounts as items in the general deficiency bill that will be prepared during the present session.

The general deficiency act approved August 4th, 1886, appropriated $395,000 to complete the tunnel, but provided that no further work should be done until the Board of Engineers had determined "whether any changes are demanded for reasons of safety or economy in the method of lining heretofore adopted and pursued." The estimate on which the above amount was appropriated was made in July, 1885, and contemplated the use of dry-stone packing as a filling back of the brick arch of the lining; the Board of Engineers decided that rubble masonry, laid in cement mortar, should be used instead of the proposed dry-stone packing (see report of the Board, copy of which is transmitted herewith). The cost of rubble masonry is $2.25 per cubic yard greater than that of the dry-stone packing, and the work, when completed, will contain about 32,000 cubic yards of that masonry; this accounts for $72,000 of the additional amount now asked for. The present estimate is based on conditions as they are known to be at this date, when there is only 1,275 feet in length of tunnel remaining to be excavated, whereas in the estimate of July, 1885, we had to rely on surmises, so far as it related to the then undeveloped portions of the work; accordingly it is now known that there must be an increase of nearly ten per cent. in the estimated length of lining, and that the length of excavation through treacherous ground calling for timbering will be more than double that contemplated in the estimate of 1885. A comparison of the two estimates, in the respects referred to above, is tabulated in the following statement, which in the estimated cost of tunnel excavation and lining shows a total increase of $155,273.50.

Tabular statement comparing estimates for excavation and lining of tunnel, as made July 31*st*, 1885, *and December* 31*st*, 1886.

EXCAVATION, AT $8 PER CUBIC YARD.

Section.	Estimate of July 31, 1885.			Estimate December 31, 1886.		
	Linear feet.	Cubic yards.	Cost.	Linear feet.	Cubic yards.	Cost.
Unlined or normal	9,823	30,014	$240,112	8,200	25,055	$200,440
Lining without timber	10,093	40,996	327,968	10,600	43,056	344,448
Lining with timber	*a*800	4,603	36,824	*b*1,900	11,645	93,160
Total	20,716	75,613	604,904	20,700	79,756	638,048

a The average cross-section was estimated at 155.85 square feet.
b About 1,750 feet will be for side and top timbers, section 167.37 square feet. About 150 feet will be for top timber only, section 143.4 square feet.

LINING.

Character of masonry.	Estimate, July, 1885 (length lining, 10,893 feet).		Estimate, December, 1886 (length of lining 12,509 feet).	
	Cubic yards.	Cost.	Cubic yards.	Cost.
Brick masonry, at $14 per cubic yard	13,447	$188,258.00	15,439	$216,146
Concrete masonry, at $5 per cubic yard	4,575	22,875.00	4,630	23,150
Dry-stone packing, at $2.50 per cubic yard	a25,163	62,907.50	.....	.....
Rubble masonry, at $4.75 per cubic yard	.....	.....	a32,000	152,000
Total	43,185	274,040.50	52,069	391,796

a The average area of section between the brick arch and rock in place to be filled with dry-stone packing (for which rubble masonry is substituted) was originally estimated at 62.37 square feet, as the recent measurements show that this must be increased to about 69 square feet.

Summary.

Estimate for excavation, December, 1886	$638,046.00
Estimate for excavation, July, 1885	604,904.00
Increased estimate for excavation	33,141.00
Estimate for lining, December, 1886	391,170.00
Estimate for lining, July, 1885	274,040.50
Increased estimate for lining	117,129.50
Total increase	150,270.50

The remaining $24,726.50, going to make up the $175,000 now asked for, is designed to cover contingencies of engineering, superintendence, &c., and to provide for emergencies that can not be foreseen, so that we shall run no risk of being found without sufficient funds on hand to complete the work.

In relation to the estimate for the fish-ways, I would simply state that it was made after consultation with the assistant to the U. S. Commissioner of Fisheries, under whose directions the plans for the work are prepared. The amount named is the least that is admissible for undertaking the reconstruction and completion of the fish-ways in the exposed locality where they are to be erected; it is indeed a question whether it would not be advisable to increase the amount to thirty thousand (30,000) dollars.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 138.]

SS[1].—*Letter transmitting estimates of Major Lydecker for completion of tunnel, etc.*

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., January 27, 1887.

Hon. WM. C. ENDICOTT,
Secretary of War:

SIR: I have the honor to submit the enclosed copy of a communication to this office, dated the 20th instant, from Maj. G. J. Lydecker, Corps of Engineers, *giving an estimate of the sums that will be required to complete the tunnel* for increasing the water supply of Washington, D. C., and for completing the *fish-ways* at the Great Falls of the Potomac River, as follows:

For completion of the tunnel	$175,000
For completion of the fish-ways	25,000

Major Lydecker presents good and sufficient reasons for the increase in the estimates for the work referred to and recommends that the amounts be included as items in the general deficiency bill, to be prepared during the present session of Congress.

In connection with this subject he incloses a copy of the report of the Board of Engineers upon the examination of the tunnel dated August 24, 1886.

Major Lydecker's views are concurred in by this office, and it is accordingly recommended that his letter and inclosure be transmitted to the Speaker of the House of Representatives for the information of the Committee on Appropriations.

Very respectfully, your obedient servant,

J. C. DUANE,
Brig. Gen., Chief of Engineers.

[Committee No. 139.]

TT.—*Letter relative to Chittenden Brothers' claim for extra material.*

WASHINGTON, D. C., *March 15th*, 1887.

Hon. W. C. ENDICOTT,
Sec't'y of War:

SIR: As contractors for construction of the dam at Great Falls we were required by the specifications to use Cumberland cement, or its equal, for masonry. During the progress of the work we were ordered by the superintending engineer to discontinue the use of Cumberland and use higher-priced Rosendale cement; this we did, notifying the engineer in writing that we claimed, and expected to be paid for, the difference in price.

Since the completion of the work we have tried, in vain, to get a settlement of the account, but have not been able to get it either allowed or disallowed. We have made written statements of the case, and on August 31st we sent to the office eight *original* documents and bills relating to the case, requesting that they be returned, and on December 13th, 1886, again called Major Lydecker's attention to the request. Neither of these communications have been answered.

We feel confident that this claim is justly due us and have been courteous in all our correspondence and interviews and think it is *not* unreasonable to ask a decision of the matter. We therefore respectfully ask you to direct the engineer officers to settle the claim and to return the papers enclosed in our letter of August 31st, 1886.

Very respectfully,

CHITTENDEN BROS.

[Third indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
Mar. 24th, 1887.

Respectfully returned to the Secretary of War, with report of Maj. Lydecker, dated Mar. 21, 1887. Major Lydecker's conclusion (last par., p. 8) is concurred in, viz, that the contractors are not, under the terms of their contract, entitled to the extra compensation.

J. C. DUANE,
Brig. Gen., Chief of Engineers.

[Fourth indorsement.]

WAR DEPARTMENT,
June 30th, 1887.

Respectfully returned to the Chief of Engineers. The claim of Chittenden Bros. is disallowed, and they will be advised accordingly.

WM. C. ENDICOTT,
Secretary of War.

[Committee No. 140.]

TT¹.—*Major Lydecker's report on claim of Chittenden Brothers for extra material, etc.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., March 21, 1887.

The CHIEF OF ENGINEERS, U. S. A.,
Washington, D. C.:

SIR: I have the honor to return herewith communication addressed to the Hon. Secretary of War, under date of March 15th, 1887, by Chittenden Brothers, in relation to a claim made by them for an allowance of the difference in prices of Cumberland

and Rosendale cements, for so much of the latter brand as was furnished by them in constructing the dam at the Great Falls of the Potomac under their contract dated November 7th, 1883.

The specification in relation to cement for use on the work was as follows:

"*Cement.*—The cement used must be equal to the best brand of Cumberland cement, and must show a tensile strength of seventy-five (75) pounds per square inch after it has been mixed with water, allowed to set, and then immersed in water for twenty-four (24) hours. It must be firmly (finely) ground, freshly burned, and sufficiently slow setting to admit of working into concrete and being put into position without loss of strength through premature setting."

Masonry work under the contract was commenced in the spring of 1884, and the cement furnished until the latter part of the ensuing summer appears, from the record, to have been satisfactory to Capt. Symons, under whose supervision the work was conducted, but this did not continue to be the case, and finally resort was had to the use of Rosendale cement under conditions indicated by the following extracts from letters addressed by him to the contractors:

1. "I wish to invite your attention to the fact that the cement which you have on hand, in ten samples, only gave a tensile strength of 42 lbs. per sq. in. average, after one day. Unless better results are obtained from future shipments the use of the Round Top will have to be discontinued." (Letter of September 3rd, 1884.)

2. "The Round Top cement now in your possession at the Great Falls does not give good satisfaction. In order to determine whether it will be suitable for the concrete [of] dam, or whether any other similar cement is better for the purpose, it will require several days to experiment and test.

"In the meantime, in order that the work may not be delayed, you are authorized to use this Round Top cement by adding to it one-half its volume of Portland cement, making a cement of the following proportions: 1 part Portland cement, 2 parts Round Top, 6 parts sand, 12 parts broken stone.

"The Portland cement to be of the best quality, and its cost, over and above the cost of an equal amount of Round Top cement, to be paid for by the U. S. * * *

"It must be understood that this is only a temporary arrangement to bridge over the present difficulty, and that no claim can come from it other than as specified in this letter. In the meantime it is desired and expected that you will use every endeavor to find a cement that will give satisfactory results." (Letter of September 5th, 1884.)

3. "The use of Portland cement in concrete will be discontinued after that which you have mixed with concrete is exhausted.

"You are requested to keep that which you have on hand to be put in dangerous places, and as a bottom course of concrete along the bed of the river.

"In making concrete and mortar for the general work only hydraulic cement, in accordance with the specifications, will be used, but its proportions will be as follows: 1.75 parts cement, 2.50 parts sand. For concrete 5 parts of broken stone will be added.

* * * * * * *

"The present supply of Round Top cement which you have on hand does not come up to the specifications or the earlier samples of same cement, and unless it is materially improved no more of it will be permitted to be used.

"To compensate you for the extra cement ordered to be used, an additional price of 50 cents per cubic yard will be paid you."

* * * * * * *

(Letter of September 11, 1884.)

4. "After submitting the matter to Major Lydecker it has been decided that the further use of Round Top cement be prohibited on the dam.

"The New York and Rosendale cement which you say you are able to procure will be accepted, always subject to inspection and test, but no extra price can be paid therefor."

(Letter of October 6, 1884.)

I do not find of record reply from the contractors to any of the above letters until that last quoted, when under the same date they write as follows to Capt. Symons:

"Your letter of this date condemning the Round Top cement for use in the construction of the Gr't Falls Dam received.

"We stand ready to furnish any brand of cement among those generally known as 'Cumberland cements' at the same price pr. yd. for completed work as specified in our contract. If, however, you demand the use of New York and Rosendale, or any other cement more expensive to us than the best brands of Cumberland, we respectfully request such modification to be made in the form of a written order to that effect, and in self-protection must demand that the difference in price be paid us as a modification of our contract.

"The importance of immediate action in this matter is well known to you in order to enable us to purchase the cement required without further delay."

This letter was submitted to me by Capt. Symons, and replied to by me as follows, under date of October 8th, 1884:

"Until I am more fully informed as to the facts in the case, I can arrive at no safe conclusion. It is evident, however, that the Cumberland cements thus far tried on the dam have not afforded such substantial and reliable results as are imperative in the higher portions of the work which spans the deep water of the Virginia channel. Whether you have failed to furnish the 'best brand of Cumberland cement,' or whether you are in any other way at fault in the matter, are questions upon which I am not at present properly informed. I will examine thoroughly into the matter, and if it shall be shown that the results are due to inherent defects in the Cumberland cements, and to no fault of yours, you will be entitled to increased compensation for the use of the higher-priced Rosendale cement, which you are now required to use, and I will pay such increase as you may be justly entitled to."

Pending the foregoing correspondence, Captain Symons frequently consulted me in relation to the quality of the cement, and I held throughout to the position that it was not for this office to prescribe any particular brand of cement, nor to concern ourselves with the price paid by the contractors for any brand which they might find themselves required to furnish in order to supply that of the quality called for by the specifications, though I assented to the temporary expedients for using the cement on hand so that advantage of the low-water conditions, then prevailing, might not be lost by delay.

It appears that the use of Rosendale cement was continued without further correspondence until May 11th, 1885, when the contractors addressed the following to Captain Symons:

"I have made a few memoranda of our conversation in reference to cement to be used at Great Falls. That we may clearly understand each other, I send them to you requesting to be corrected if in error in any point. 1st. You wish to return to the use of the ordinary cement as contemplated in the contract and in the proportions called for by the specifications. 2nd. That after the Rosendale cement now on hand is used you would not allow any extra price for using higher grade cement. 3rd. That you consider the use of cement in sacks to be one of the principal causes of trouble last fall owing to the dampness of our storehouses, in which it rapidly deteriorated; you therefore want us to get cement in barrels hereafter. 4th. While not wishing to call for any special brand of cement, the Round Top, as furnished by Messrs Waters, has given uniformly good results on the other parts of the water-works extension, and you think it will at the Great Falls. 5th. The Union cement, furnished by J. M. Wheatley, also gave excellent results last season, and you would like to have us use a trial lot of it. 6th. All letters ordering changes in cement or different proportions or mixtures of different cements are revoked."

To this Captain Symons replied under date of May 14, 1885, as follows:

"In reply to your letter of May 11, I have the honor to inform you that after the Rosendale cement on hand at the beginning of work this spring is used, no further allowance will be paid for the use thereof.

"Hereafter the interpretation of the specifications will be that you will be required to furnish a cement for the work satisfactory both as regards preliminary tests and actual construction to be used in the proportions designated in the specifications and to be paid for at the prices named in the contract.

"This cement may be any brand of Cumberland, Rosendale, Union, or other hydraulic cement, which will give results as good and satisfactory as have hitherto been obtained with the best brands of Cumberland cement in the city.

"Very excellent results have been obtained by the use of Round Top cement in the other parts of the water-works extension, and I can see no good reason why it should not do well at the Great Falls if furnished freshly ground and not allowed to deteriorate after reaching the site of the work.

"I am inclined to believe that the trouble with it last fall was owing largely to its being received in sacks, which allowed the damp atmosphere about the falls too free access to it. I certainly think it best to use cement in barrels.

"In regard to the Union cement, I will say that it seemed to be a cement of great promise last season.

"We made no practical test of it, however, and I do not know of any having been made. If it is what it is claimed to be, and what Prof. De Smedt thinks it is, it will certainly become a favorite brand of cement. I should like to see it tried, but you must understand, of course, that any trial of it at the dam is entirely at your own risk. All letters ordering changes in cement, or different proportions or mixtures of different cements, are revoked.

It will be observed that this letter contains the first suggestion from this office implying that any extra allowance being made for the use of Rosendale cement, and I am quite sure that its existence was unknown to me until I undertook a full search of the record after the contractors filed their claim with me in the summer of 1886.

After full examination into their claim, I concluded the contractors were not, under

the terms of their contract, entitled to the extra compensation, for I judged from the evidence before me that they had not supplied the best brand of Cumberland cement, or one equal to it, and fulfilling the requirements of the specifications, which, it will be observed, did not call specifically for Cumberland, but which were carefully drawn so as to avoid restriction to any specified brand, and to rigidly establish a standard only.

To what extent the quality of the cement was affected by its delivery in bags and storage in damp store-houses I am unable to state, but certainly the U. S. can be held to no liability on that account. It seems to be established that the local cements furnished in the early part of the work on the dam, as well as those furnished throughout on the other parts of the aqueduct work, gave satisfaction to those charged with its supervision and inspection.

Referring to the statement in the letter with reference to which this report is made, that the contractors have been unable to get their claim either allowed or disallowed (by me), I would state that in several interviews prior to December 31st, 1886, I stated to them, in substance, that I did not see my way clear to its allowance, and gave my reasons therefor.

The eight original documents referred to as having been sent to me with their letter of August 31st, 1886, will be returned to them at once, and would have been so disposed of before now if I had not failed to note that the letter requested their return.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Maj. of Engineers, U. S. A.

[Committee No. 141.]

UU.—*Indorsements on letter of Beckwith & Quackenbush relative to a certain tunnel section.*

[1st indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
May 28, 1887.

Respectfully referred to Major G. J. Lydecker, Corps of Engineers, for report.
To be returned.
By command of Brig. Gen. Duane.

JAS. C. POST,
Major of Engineers.

[2nd indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, July 13, 1887.

Respectfully returned to the Chief of Engineers, U. S. A., with report.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 142.]

UU[1].—*Major Lydecker's report relative to matters contained in letter of Beckwith & Quackenbush to the Chief of Engineers.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., July 13, 1887.

The CHIEF OF ENGINEERS, U. S. A.,
Washington, D. C.:

SIR: I have the honor to submit the following report in relation to matters contained in a letter written to the Chief of Engineers, under date of May 26th, 1887, by Beckwith and Quckenbush, contractors for the tunnel extension of the Washington Aqueduct, and subsequently referred to me for report; their letter is returned herewith.

For the purposes of this report it will be best to pass over, for the present, the history of the work as outlined in the contractors' letter, and deal at once with the matters in relation to which they appeal from my decision. To this end I will take up in their order, and reply to, each item of objection as summarized by the contractors (see their letters, page 5).

"1st. We are required to run our own lines and grades, and are held responsible for them."

It was found that the contractors' agents showed great carelessness in keeping to the lines and grades given them, and in preserving the marks established by our engineering force; it was, therefore, finally determined to set suitable pegs, or marks, in the several headings, and hold the contractors responsible for deviating from the lines and grades thereby indicated; this was not done until all the headings were well advanced—the shortest heading having been driven about 700 feet, and the longest about 1,400 feet from the bottom of the working shafts from which they were started. I do not see that the contractors have any sufficient cause of complaint on this account, nor does it appear to be a matter of importance at this time, the tunnel having now been "holed" through.

"2nd. We are required to take out rock outside the section fixed, for $1.50 per cubic yard."

This price was determined upon in the early part of the work, after careful consideration, under the following clause of the specifications: "In all cases the prescribed section must be preserved, and no payment will be made for material excavated outside the specified lines and grades; but all loose or insecure rock outside these lines, whether resulting from natural causes or from the prosecution of the work, that may be likely to fall into the tunnel must be removed. In cases where the necessity for such removal is not occasioned by the shattering of the rock by blasting, but is due to natural seams, cracks, or fissures, a fair price will be paid for removing the same; if the necessity results from the operation of blasting, the removal must be at the expense of the contractor. All questions arising in this connection will be determined by the United States engineer, and the price to be paid for removal will be fixed by him, and his decision shall be accepted by the contractor as final." There appears to me no reason for changing, at this late date, the price for removal as fixed upon in the beginning, and which has been the basis of payment throughout.

"3rd. A section has been prescribed which will exactly admit the introduction of the brick masonry."

Reference is here made to the section for excavation in rock which requires lining, but not timbering, being section No. 2 on the annexed sheet, which shows the several forms of sections finally adopted, as the basis of operations in the varying characters of rock that had been encountered. They were furnished to the contractors in the spring of 1885, and were published in the annual report for that year; they have appeared in all estimates laid before Congress for additional appropriations; they have also been the basis of all payments to the contractors, and it was not until the past winter that they presented to me any objection thereto. The specifications relative to tunnel cross section provided as follows: "The cross-section of tunnel will be rectangular, eleven (11) feet wide by seven and one-half (7½) feet high, except where lining is required, when the cross-section of excavation will be increased to such limits as the U. S. engineer shall indicate." (Then follows the clause before quoted in this letter, see page 2.) Under this clause the lining section, as prescribed, was the outline of the brick-work, neither more or less; though the method of packing, out to the irregularities of excavation which it was known would of necessity exist, was likewise indicated, but the limit of excavation required, and allowed, was the outline of the brick-work, giving a cross-section of 109.67 feet, an increase of 27.17 feet over that for the unlined portions named in the contract. The clause of the specifications quoted above was purposely drawn to prohibit payments for excavation beyond the prescribed lines and grades, at the same time clearly contemplating the facts that the rocks would break beyond these limits, and that such rock, except in certain specified contingencies, must be removed by the contractor at his own expense. If it is claimed that the section referred to is not the controlling one, but that the change to lining section was in the nature of a modification of the specifications, (which the U. S. engineer found it necessary to make) then the part of the specifications applicable thereto is as follows:

"Written notice of any modification will, in each case, be furnished the contractor by the United States engineer, and no claim for extra allowance on account of such modification will be considered or allowed, unless presented in writing to the said engineer by the contractor within forty-eight hours after receipt of such notice." As before stated, the first presentation of any claim for additional compensation for excavating this lining section made to me by the contractors was in their letter of January 19th, 1887, though Captain Symons, in his letter to them, dated May 6, 1885, distinctly states: "At points where lining is necessary and the ground sufficiently firm not to require timbering, the outline of the *arch only* will be allowed in accordance with previous decisions." Further, supplemental articles of agreement were entered into with the contractors, under date of October 18, 1886, having special reference to the work of lining, and though the specified limit of allowance in excavation had then been in operation for at least a year and a half, had been the basis of payments previously made to contractors, the basis of estimates printed in my an-

nual report, and of the estimates on which Congress made the appropriation through which the supplemental articles of agreement were developed, still no suggestion of an increased allowance for excavation in the lining section was then made or contemplated. Under all these circumstances it was quite evident to me that I must deny the claim for such increased allowance when it was finally presented.

"4th. We are enlarging the tunnel, where ordered, after it has once been taken out to the normal section of 7½ x 11 feet."

In reply to this it is enough to remark that they were fully aware that such must of necessity be the case when they undertook to do the work of lining contemplated by their supplemental contract.

There does not appear to be any good reason for extending this report by lengthy comments on the history of the work as recited by the contractors; the several cross-sections and instructions relating to lining (referred to on page 2 of the contractor's letter) were designed to meet local conditions as they had developed during the early period of the work, when no considerable extent of lining was contemplated, but the contractors placed no lining in the manner indicated by these early sections and instructions; nor did they begin to place any lining until the middle of July, 1885, before which date the forms of section finally adopted had been furnished them, being with Captain Symons' letter of May 6, 1885; all work of lining has been in substantial conformity with those sections. The subsequent limitation of lining operations to the dangerous portions of the tunnel arose from the necessity of limiting expenditures, so that all the money then available would not be exhausted and the work brought to a stand-still before Congress had an opportunity to make an additional appropriation; the order of suspension of January 30, 1886, was made when the money was reduced to about $1,500, and this small balance (supplemented by a subsequent special appropriation of $5,000) was applied to keeping the tunnel from becoming full of water until the next appropriation became available; the price paid for pumping is believed to have been adequate to meet the expense properly chargeable to that item only, but it is my understanding that the cost at $48 per day includes the wages of persons whose services were not necessary in that connection, but important to the contractors in other respects—such as the care of plant, reorganization for the resumption of work, etc.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 143.]

VV.—*Letter of Beckwith & Quackenbush requesting extension of contract.*

GEORGETOWN, D. C., *June 9th*, 1887.

Major G. J. LYDECKER,
U. S. Engineer, Washington, D. C.:

DEAR SIR: We respectfully ask that our contract with the United States for the construction of the Washington Aqueduct tunnel to be extended from June 30th, 1887, to June 30th, 1888.

Respectfully, yours,

BECKWITH AND QUACKENBUSH.

[1st indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, June 29, 1887.

Respectfully forwarded to the Chief of Engineers, U. S. A.

Operations on the tunnel are now being carried on (1) under the original contract made October 29, 1883, its present application being mainly to the work of excavation, and (2) under supplemental articles of agreement dated October 18, 1886, which make provisions concerning the masonry lining. The work of excavation, except that required for enlarging for lining, is about completed; the principal work to be done is that of lining. I see no reason for extending the contract to the date named herein, because the money now available should be exhausted by or before November 30th, 1887, if proper progress is made on the work. I would, therefore, respectfully recommend that the period of operations under the original contract and supplemental articles referred to above be extended to November 30th, 1887.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[2nd indorsement.]

OFFICE OF CHIEF OF ENGINEERS, U. S. ARMY,
June 30, 1887.

Respectfully returned approved as recommended by Major Lydecker.
After such record as may be necessary has been made, this paper will be returned to this office.
By command of Brig. Gen. Duane.

THOMAS TURTLE,
Captain of Engineers.

[3rd indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, July 2, 1887.

Respectfully returned to the Chief of Engineers, U. S. A., the necessary record having been made in this office.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 144.]

WW.—*Major Lydecker recommending extension of time to Maloney & Gleason under certain conditions.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., June 29, 1887.

The CHIEF OF ENGINEERS, U. S. A.,
Washington, D. C.:

SIR: I have the honor to transmit herewith copy of letter from Messrs. Maloney and Gleason, requesting a further extension of their contract for work on the new reservoir, near Howard University, to include the balance of the present working season.

This contract was entered into October 30th, 1883, and called for the completion of the work by June 30th, 1885. The time has been successively extended to June 30th, 1886; December 31st, 1886, and June 30th, 1887. The contractors have at no time carried on the work with any approximation to that degree of vigor or extent of plant and working force called for by their contract; they have shown no improvement in these respects under the last extension, notwithstanding they were informed at the time it was authorized (February 9th, 1887) that I did "not deem it at all likely that any further extension of time will be granted;" they then had ample time and opportunity to have themselves in good condition for work at the opening of the season of operations, and were informed that the principal items of work required of them would comprise about 45,000 cubic yards earth excavation, 27,000 square yards paving, and 20,000 square yards sodding. The estimates of progress on these items up to the end of May were: Excavation, 15,334 cubic yards; paving, 6,041 square yards, and no sodding; but the last is of no material importance.

There was nothing in the conditions of weather or difficulties of the work for which the contractors ought not have been amply forewarned and prepared by their long experience under the frequently extended contract.

Under all these circumstances, and for the further reason that the United States has already been put to very considerable unnecessary expense for the cost of supervision and inspection alone, on account of the dilatory work of the contractors, I can not justify myself in making recommendation for any further unqualified extension of this contract; nor do I wish, at this late date, to see the contract annulled, with attendant penalties. As a medium course, therefore, I would respectfully recommend that the contract be still further and finally extended to October 31st, 1887; on condition that the contractors enter into supplemental articles of agreement under which, in consideration of such extension, a large part of the cost of supervision and inspection, say not less than $500 per month during the period of extension, shall be charged against and deducted from the amounts found due them.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[First indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
June 30, 1887.

Respectfully returned to Maj. Lydecker, approved, the assent of bondsmen being obtained to the supplementary articles. To be returned.
By command of Brig. Gen. Duane.

THOMAS TURTLE,
Captain of Engineers.

[Second indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, July 16, 1887.

Respectfully returned to the Chief of Engineers, U. S. A., with the recommendation that the sum to be charged monthly against the contractors be reduced from $500 to $300; this will carry out my original purpose, which was to fix the sum at about one-half the estimated cost of supervision and inspection. I also recommend that the requirement as to assent of the original bondsmen be waived, for the reason that it can only be done, if at all, at the expense of much time and trouble, and it is not apparent that such assent is necessary, under the circumstances, to protect the interests of the United States. Besides, it is represented to me that one of said original bondsmen is dead, while another is out of the country and can not be reached.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Third indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
July 20, 1887.

Respectfully returned to Major Lydecker, approved, by direction of the Chief of Engineers, assent of bondsmen being waived. To be returned.

By command of Brig. Gen. Duane.

THOMAS TURTLE,
Captain of Engineers.

[Fourth indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, July 22, 1887.

Respectfully returned to the Chief of Engineers, U. S. A., with supplemental articles of agreement (in quintuplicate) for approval.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Fifth indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
July 26, 1887.

Respectfully submitted to the Secretary of War, with recommendation for approval.

The original contract is herewith.

J. C. DUANE,
Brig. Gen., Chief of Engineers.

[Sixth indorsement.]

WAR DEPARTMENT,
July 28th, 1887.

Approved.

By order of the Secretary of War.

SAM'L HODGKINS,
Acting Chief Clerk.

[Seventh indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
July 30, 1887.

Respectfully returned to Major Lydecker for his information. Three copies of the supplemental contract are inclosed, to be disposed of in accordance with law and regulations. This paper to be returned.

By command of Brig. Gen. Duane.

THOMAS TURTLE,
Captain of Engineers.

[Eighth indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, August 1, 1887.

Respectfully returned to the Chief of Engineers, U. S. A.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 145.]

W W[1].—*Maloney & Gleason's request for extension of time.*

WASHINGTON, D. C., *June* 15, 1887.

Major G. J. LYDECKER:

D'R SIR: We most respectfully ask for an extension of our contract for the construction of the reservoir for the season of work to do the sodding and complete the same. We commenced late in the season and, owing to the unprecedented weather and the quicksand, we have worked under great difficulties and expense, but are now in good condition to complete the same this season.

Yours, very respectfully,

MALONEY AND GLEASON.

[Committee No. 146.]

WW[2].—*Letter transmitting supplementary contract with Maloney & Gleason.*

OFFICE OF THE CHIEF OF ENGINEERS, UNITED STATES ARMY,
Washington, D. C., July 30, 1887.

The SECOND COMPTROLLER OF THE TREASURY:

SIR: I transmit herewith a supplemental contract entered into July 20, 1887, by Major G. J. Lydecker, Corps of Engineers, for and in behalf of the United States of America, with Maloney and Gleason for construction of reservoir for increasing the water supply of Washington, D. C., for file with the original contract sent to your office November 6, 1883.

The supplemental contract was approved by order of the Secretary of War July 28, 1887.

Very respectfully, your obedient servant,

J. C. DUANE,
Brig. Gen., Chief of Engineers.

[Committee No. 147.]

XX.—*Indorsements on letter of November* 28, 1887, *Beckwith & Quackenbush, submitting correspondence in reference to tunnel section.*

[First indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
Nov. 30, 1887.

Respectfully referred to Major G. J. Lydecker, Corps of Engineers, for report.
By command of the Act'g Chief of Engineers.

THOMAS TURTLE,
Captain of Engineers.

[Second indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, December 8, 1887.

Respectfully returned to the Chief of Engineers, U. S. A.

The chief feature of this communication appears to be the appeal to the Secretary of War in relation to the question of increasing the area heretofore adopted as the basis of payment for evacuation of lining section in tunnel. The ground of the contractors' claim is that our allowance "is contrary to current engineering practice." We reply that such practice is not the controlling consideration and that under the conditions of the contract and all attendant circumstances, their claim can not be allowed. This question is considered at length in my reports of July 13 and October 28, 1887, copies of which are herewith. If this claim is a good one it is a most powerful reason why the work ought not to be continued and completed under any existing contract, even if such course should be authorized by law. Therefore I am not prepared to recommend that Congress take action looking to the completion of the work under these contracts, as suggested in this communication. Simply to correct a mistake

herein (page 1) I would call attention to the fact that no recommendation whatever was made by the "Engineer Board" in relation to resuming work, in 1886, under the original contract.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Third indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
Dec. 12, 1887.

Respectfully returned to the Secretary of War.

Messrs. Beckwith and Quackenbush desire to secure two objects from the consideration of this letter.

1st. To have their present contract and the supplementary articles of agreement extended over future appropriations to the completion of the tunnel; and 2nd, to obtain payment for a section of excavation "to include a clearance of six inches all around the arch.

With reference to the first point, Messrs. Beckwith and Quackenbush remark that they "do not propose here to discuss the question of their legal right to complete the work under the original contract." This office *can not* discuss it; to do so would be to admit that the contract could have been made to create an obligation in excess of appropriations already provided, which is contrary to law.

As to the extension of the contract and the supplementary articles over future appropriations, the power to do so is not known to this office, unless such extension be provided for in the acts making the appropriations. The policy of doing so is questionable and is not recommended in the present case.

In regard to the requested allowance for increased section of excavation, it is noted that the specifications, page 4, relative to *cross-section of tunnel*, establish that where lining is required "the cross-section of excavation will be increased to such limits as the United States engineers shall indicate." The limits were prescribed accordingly, and this office can not recommend that allowance be granted as requested, especially when the limits were not objected to until so long after the fact.

CHAS. W. RAYMOND,
Acting Chief of Engineers.

[Committee No. 148.]

XX[1].—*Reports of Major Lydecker in relation to increased allowance for tunnel excavation claimed by Beckwith & Quackenbush.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., July 13, 1887.

The CHIEF OF ENGINEERS, U. S. A.,
Washington, D. C..

SIR: I have the honor to submit the following report in relation to matters contained in a letter written to the Chief of Engineers, under date of May 26th, 1887, by Beckwith & Quackenbush, contractors for the tunnel extension of the Washington Aqueduct, and subsequently referred to me for report; their letter is returned herewith.

For the purposes of this report it will be best to pass over, for the present, the history of the work as outlined in the contractors' letter and deal at once with the matters in relation to which they appeal from my decisions. To this end I will take up in their order, and reply to, each item of objection as summarized by the contractors (see their letter, page 5).

"1st. We are required to run our own lines and grades and are held responsible for them."

It was found that the contractors' agents showed great carelessness in keeping to the lines and grades given them and in preserving the marks established by our engineering force; it was, therefore, finally determined to set suitable pegs or marks in the several headings and hold the contractors responsible for deviating from the lines and grades thereby indicated; this was not done until all the headings were well advanced, the shortest heading having been driven about 700 feet and the longest about 1,400 feet from the bottom of the working shafts from which they were started. I do not see that the contractors have any sufficient cause of complaint on this account, nor does it appear to be a matter of importance at this time, the tunnel having now been "holed" through.

"2nd. We are required to take out rock outside the section fixed for $1.50 per cubic yard."

This price was determined upon in the early part of the work, after careful consideration, under the following clause of the specifications: "In all cases the prescribed section must be preserved, and no payment will be made for material excavated outside the specified lines and grades; but all loose or insecure rock outside these lines, whether resulting from natural causes or from the prosecution of the work, that may be likely to fall into the tunnel, must be removed. In cases where the necessity for such removal is not occasioned by the shattering of the rock by blasting, but is due to natural seams, cracks, or fissures, a fair price will be paid for removing the same; if the necessity results from the operation of blasting, the removal must be at the expense of the contractor. All questions arising in this connection will be determined by the United States engineer, and the price to be paid for removal will be fixed by him, and his decision shall be accepted by the contractor as final."

There appears to me no reason for changing, at this late date, the price for removal as fixed upon in the beginning, and which has been the basis of payment throughout.

"3rd. A section has been prescribed which will exactly admit the introduction of the brick masonry."

Reference is here made to the section for excavation in rock, which requires lining but not timbering, being section No. 2 on the annexed sheet, which shows the several forms of sections finally adopted as the basis of operations in the varying character of rock that had been encountered. They were furnished to the contractors in the spring of 1885, and were published in the annual report for that year; they have appeared in all estimates laid before Congress for additional appropriations; they have also been the basis of all payments to the contractors, and it was not until the past winter that they presented to me any objection thereto.

The specifications relative to tunnel cross-section provided as follows: "The cross-section of tunnel will be rectangular, eleven (11) feet wide by seven and one-half (7½) feet high, except where lining is required, when the cross-section of excavation will be increased to such limits as the U. S. engineer shall indicate." (Then follows the clause before quoted in this letter; see page 2.) Under this clause the lining section, as prescribed, was the outline of the brick-work, neither more nor less, though the method of packing, out to the irregularities of excavation, which it was known would of necessity exist, was likewise indicated, but the limit of excavation required and allowed was the outline of the brick-work, giving a cross-section of 109.67 feet, an increase of 27.17 feet over that for the unlined portions named in the contract. The clause of the specifications quoted above was purposely drawn to prohibit payments for excavation beyond the prescribed lines and grades, at the same time clearly contemplating the facts that rock would break beyond these limits, and that the rock, except in certain specified contingencies, must be removed by the contractor at his own expense. If it is claimed that the section referred to is not the controlling one, but that the change to lining section was in the nature of a modification of the specifications (which the U. S. engineer found it necessary to make), then the part of the specifications applicable thereto is as follows:

"Written notice of any modification will, in each case, be furnished the contractor by the United States engineer, and no claim for extra allowance on account of such modification will be considered or allowed unless presented in writing to the said engineer by the contractor within forty-eight hours after receipt of such notice." As before stated, the first presentation of any claim for additional compensation for excavating this lining section made to me by the contractors was in their letter of January 19th, 1887, though Captain Symons, in his letter to them dated May 6, 1885, distinctly states: "At points where lining is necessary, and the ground sufficiently firm not to require timbering, the outline of the *arch only* will be allowed in accordance with previous decisions." Further supplemental articles of agreement were entered into with the contractors under date of October 18, 1886, having special reference to the work of lining, and though the specified limit of allowance in excavation had been in operation for at least a year and a half, had been the basis of payments previously made to contractors, the basis of estimates printed in my annual report, and of the estimates on which Congress made the appropriation through which the supplemental articles of agreement were developed, still no suggestion of an increased allowance for excavation in the lining section was then made or contemplated. Under all the circumstances it was quite evident to me that I must deny the claim for such increased allowance when it was finally presented.

"4th. We are enlarging the tunnel, where ordered, after it has once been taken out, to the normal section of 7½ x 11 feet."

In reply to this, it is enough to remark that they were fully aware that such must of necessity be the case when they undertook to do the work of lining contemplated by their supplemental contract.

There does not appear to be any good reason for extending this report by lengthy

comments on the history of the work as recited by the contractors. The several cross-sections and instructions relating to lining (referred to on page 2 of the contractor's letter) were designed to meet local conditions as they had developed during the early period of the work, when no considerable extent of lining was contemplated; but the contractors placed no lining in the manner indicated by these early sections and instructions, nor did they begin to place any lining until the middle of July, 1885, before which date the forms of section finally adopted had been furnished them, being with Captain Symons' letter of May 6, 1885. All work of lining has been in substantial conformity with these sections. The subsequent limitations of lining operations to the dangerous portions of the tunnel arose from the necessity of limiting expenditures, so that all the money then available would not be exhausted and the work brought to a standstill before Congress had an opportunity to make an additional appropriation. The order of suspension of January 30th, 1886, was made when the money was reduced to about $1,500, and this small balance (supplemented by a subsequent special appropriation of $5,000) was applied to keeping the tunnel from becoming full of water until the next appropriation became available. The price paid for pumping is believed to have been adequate to meet the expense properly chargeable to that item only, but it is my understanding that the cost, at $48 per day, includes the wages of persons whose services were not necessary in that connection, but important to the contractors in other respects, such as the care of plant, reorganization for the resumption of work, &c.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, October 28, 1887.

The CHIEF OF ENGINEERS, U. S. A.,
Washington, D. C.:

SIR: I have the honor to submit the following remarks in relation to the communication of Messrs. Beckwith & Quackenbush, dated October 17, 1887, referred to me by indorsement of the 27th instant, though my report of July 13, 1887, in relation to this claim leaves but little opportunity for further remark.

The spirit of the specifications which control on this work (and not current engineers' practice, or the practice on the New York aqueduct tunnel), is that the contractors shall be *paid* for excavation to certain lines, the normal rectangular section (7½x11) in one case, and the outline of the masonry arch, side-walls, and invert in the other; it is recognized that to reach these limits, the excavation will extend beyond them, but the specifications do not contemplate payment for such exterior excavation; this fact is not made apparent in the limited quotations from the specifications made herein. It must be quite evident that the extent of this outside excavation is largely dependent upon the care and skill of the contractors.

The contractors were advised of this ruling as early as November 5, 1884; the quotation herein from Capt. Symons' letter of May 6, 1885, is incomplete in omitting the final clause of the paragraph, viz, "in accordance with previous decisions."

The contractors state, "When Capt. Symons' order began to take effect we appealed to Major Lydecker under date of January 19th, 1887, &c." In fact, the work of lining was in progress at the date of his order, and the amount of brick lining that had been actually put in place and paid for up to the end of January, 1887, was 3,525 cubic yards, or about one-third of the entire amount placed up to the present time, viz, 10,891 cubic yards; therefore, the first appeal from Capt. Symons' ruling was not presented to me when "it *began* to take effect," but more than two years after he made it. In the meantime, this ruling had been the basis of estimate submitted to Congress, published in annual reports and special communications, familiar to contractors; was in full force at the time they entered into their supplemental articles of agreement having special reference to lining, dated October 18, 1886, and they had, without protest, placed and been paid for lining aggregating in value about $65,000.

The length of tunnel lined to date is 8,767 feet; the claim of $5.89 per foot for increased compensation, presented by the contractors herein, therefore amounts to $51,637.63. The appropriation being about exhausted, the work of lining under existing contracts has been discontinued.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 149.]

XX[2].—*Letter of Beckwith & Quackenbush to the Chief of Engineers, with indorsements.*

BECKWITH & QUACKENBUSH,
Georgetown, D. C., October 17, 1887.

General JAMES B. DUANE,
Chief of Engineers, U. S. A., War Department, Washington, D. C.:

DEAR SIR: We have repeatedly called the attention of the United States engineer in charge of the Washington Aqueduct tunnel, Major J. G. Lydecker, to the injustice which has been done us by the insufficient area of the standard lining section, prescribed in the order of Capt. Thomas W. Symons, dated May 6th, 1885.

The language of Capt Symons' order was as follows:

"At points where lining is necessary and the ground sufficiently firm not to require timbering, the outline of the arch in excavation only will be allowed (in accordance with previous decisions.—G. J. L.)

The clause of the contract under which this section was prescribed occurs on page 4 of the printed contract, under the head "cross-section of tunnel," and is as follows:

"The cross-section of tunnel" will be rectangular, eleven (11) feet wide by seven and one-half (7½) feet high, except where lining is required, when the cross-section of excavation will be increased to such limits as the United States engineer shall indicate."

In this connection we have only to say that when we signed the contract containing the above clause, we assumed that the U. S. engineer, whenever called upon to act under its provisions, would be guided by the invariable engineering practice in such cases, which is to allow a clearance around the outline of the arch sufficient to cover approximately the excavation outside the neat line of the arch which is indispensably required for the subsequent packing of the masonry, and Capt. Symons had no right to arbitrarily fix a section payment of excavation which was at once unfair, unjust, and impossible to procure.

When Capt. Symons' order began to take effect, we appealed to Major Lydecker under date of January 19th, 1887, a copy of which is annexed, marked "Exhibit A."

On February 17th, 1887, we addressed to Major Lydecker a second communication, enclosing official sections of the New York tunnel as evidence of "current engineering practice;" the said sections being now in the possession of that officer.

A copy of this communication is annexed, and marked "Exhibit B."

On March 7th, 1887, we addressed a third communication to Major Lydecker, which is annexed and marked "Exhibit C."

No action being taken on these communications, we asked that the matter might be referred to you by Major Lydecker, with such indorsement as he might see fit to make, in order to bring it officially before the head of the Corps of Engineers.

Major Lydecker thereupon sent up our application disapproved.

Subsequently we waited upon you personally at the headquarters of the Engineer Corps, and were verbally informed by you that you could take no further cognizance of our application until we should specify a section, conforming, in our judgment, to current practice in such cases, stating therewith the increase of volume of excavation which such section would give over that allowed by the U. S. engineer in his monthly estimates, and the approximate amount of compensation which we might consider due us thereby.

Subsequent to this interview we addressed a letter to you giving a complete history of our connection with the tunnel enterprise, a copy of which is annexed, dated May 26th, 1887, and marked "Exhibit D."

Since that time we have collected evidence showing what has been the practice of engineer in allowing for excavation in lined tunnels driven by the cubic yard.

The practice has varied from an allowance of the entire actual excavation down to a clearance of six (6) inches all round the brick work, which stands as the minimum of practice.

The section prescribed by Capt. Symons, exactly circumscribing the brick arch, has an area of 109.67 square feet, which gives 4.061 cubic yards of excavation to the lineal foot.

If we adopt the minimum of clearance allowed in current engineering practice, namely, six (6) inches all round the arch, including the invert, the area of the resulting cross-section would be 109.67+19.85=129.52 square feet, which gives 4.797 cubic yards of excavation to the lineal foot.

The result would be 0.736 cubic yards per lineal foot more than the estimates of the U. S. engineers as rendered monthly on the basis of Capt. Symons' section, and the compensation, therefore, at the contract price would be five dollars and eighty-nine cents ($5.89) per lineal foot.

The total for the whole work can not at this time be estimated, for the reason that no definite data exists as to the ultimate lineal extent of the tunnel to be brought under the effect of this form of section.

We therefore limit our application to the lineal foot, leaving the total to be determined by the final result.

Our application is that the section to be allowed in excavation for brick in ground requiring lining but not timbering, may be made to include a clearance of six (6) inches all round the arch and to have an area of 129.52 square feet; the said section to apply to the entire portion of the tunnel so treated; and that said section be substituted for the one prescribed by Capt. Symons in his letter of May 6th, 1885.

Very respectfully,

BECKWITH & QUACKENBUSH,
Contractors.

[First indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
Oct. 27, 1887.

Respectfully referred to Major G. J. Lydecker, Corps of Engineers, for information and remarks.

To be returned.

By command of Brig. Gen. Duane.

THOMAS TURTLE,
Captain of Engineers.

[Second indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, October 28, 1887.

Respectfully returned to the Chief of Engineers, U. S. A., with remark.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 150.]

XX³.—*Exhibit A.*

BECKWITH & QUACKENBUSH,
Georgetown, D. C., Jan. 19*th*, 1887.

G. J. LYDECKER, Esq.,
Major Engineers, U. S. A., Washington, D. C.:

DEAR SIR: By letter of Captain Thomas W. Symons, dated May 6th, 1885, we were notified that a section had been prescribed, or indicated, for such portions of the tunnel as might require masonry lining, but did not require timbering. This section was assumed to circumscribe the exterior of the brick arch and no more, and its area was computed at 109.67 square feet. This action, we were informed, was taken from authority derived from the clause of the contract between the United States and ourselves, relating to cross-sections, as follows:

"The cross-section of the tunnel will be rectangular, eleven (11) feet wide by seven and one-half (7½) feet high, except where lining is required, when the cross-section of excavation will be increased to such limits as the United States engineer shall indicate."

Our experience has demonstrated that this section is impracticable for the purposes required, namely, to admit a masonry arch securely based and packed as required by the specifications.

Owing to the shape of the section and the formation of the rock in which we are operating, it is impossible to provide the clearance required for proper packing of masonry, to secure a solid mass, without breaking an actual section considerably larger than the theoretical one indicated by Capt. Symons.

We do not refer to slips, or extra clearages, due to seams and fissures in the rock, but to the actual work which we are in practice compelled by the orders of the engineer in charge and by the requirements of the inspectors to do, in order to carry out the letter and intent of the specifications regarding the masonry lining and its necessary incidents.

The fact that a concrete base is required under the floor of the invert and rubble masonry packing behind the benches and spring of the arch, shows clearly that an actual section, larger than the theoretical one established by Capt. Symons, was con-

templated, as unavoidably incident to the proper execution of the work. In most of the area which has been decided to require lining, the excavation had been completed to the normal section of seven and one-half (7½) by eleven (11) feet, and in order to prepare this for lining, we have to go over the whole ground anew, at enormously increased cost, considering the amount of additional excavation allowed by adherence to Captain Symons' theoretical section.

As an instance of the practical operation of this ruling, we cite item in the estimate for December, 1885, where in Foundry Branch shaft (both headings) we enlarged 220 lineal feet from the normal section to that required for lining, and the estimate paid us $3.57 per lineal foot for that work; whereas, as shown by our expense roll, the actual cost to us of the same work was $16.74 per lineal foot.

We understand perfectly that a standard section must be established. We do not ask to be paid the contract excavation rates for the entire actual section removed.

All we ask is, that the standard section shall be determined upon dimensions which will recognize the fact that the specifications as a whole require clearance between the exterior of brick masonry and the circumjacent rock walls.

Adherence to the theoretical section indicated in Captain Symons' letter of May 6, 1885, referred to, when viewed in connection with the other requirements of the specifications, has no other effect than that of an arbitrary decree that we shall be compelled to receive compensation for an assumed amount of work, inevitably less than the actual amount which we are, by the terms of our contract, compelled to perform.

It will not do to assume that the Government requires no larger section than the theoretical one required to exactly circumscribe the arch, or that the contractors must make any additional excavation at their own risk, because the Government, through the practice of its engineers, does actually require a larger section; and we are just as much compelled to produce it in order to meet the other requirements of the lining as we are to produce the theoretical section in order to admit of the introduction of the arch at all.

In order to demonstrate more clearly the difference between hypothetical requirements of the assumed section and the actual requirements of the practical lining in place, we append a series of platted actual cross-sections of the work as done, each having the outline of the theoretical section drawn into it.

[Committee No. 151.]

XX[4].—*Exhibit B.*

GEORGETOWN, *Feb'y* 17, 1887.

G. J. LYDECKER, Esq.,
Major of Engineers, U. S. A., Washington, D. C.:

DEAR SIR: Supplementary to our communication of the 19th ult., we beg to call your attention to the accompanying official section of the New York tunnel, showing, 1st, the brick arch; 2nd, the various standard sections allowed in excavation; 3rd, the relation of each standard section to the quality of ground for which it is determined.

Our object in calling your attention to this section is to verify the position which we maintained in our former communication, to the effect that, in the tunnels involving lining, current engineering practice recognizes the necessity of a clearance between the exterior of the arch and the circumjacent walls of the standard section allowed in excavation, in view of the requirements of masonry packing for the security of the arch.

The accompanying official tracing shows, 1st, a minimum standard section involving 4 inches clearance all round the brick barrel; 2nd, a maximum neat line of excavation, involving 8 inches clearance; 3rd, a temporary timber section, involving clearance to the line of actual excavation; 4th, a permanent timber section, rectangular in form.

In estimates of payment the minimum or 4-inch clearance section is employed as a basis of computation in sound rock, free from fissures, in which, it is assumed by the engineers, the nearest approximation of the actual to the standard section is possible.

The maximum neat section, having 8 inches clearance all round, is employed for computation in ground showing fissures, or other irregularities which tend to enlarge the disparity between the actual and standard sections beyond the control of the contractors, but not sufficiently infirm to require timbering.

The temporary timber section is that in which the engineers require removal of the timber supports preparatory to lining and packing. On this section the actual volume of rock removed is allowed in excavation,

The permanent timber section is that employed as a basis of computation in ground

requiring the retention and bricking-in of the timber supports, and the whole area circumscribed by the exterior line of the timber in place is allowed.

We think we are justified in referring to this great enterprise as a fair example of current engineering practice, as it is generally admitted to be the most extensive piece of tunnel work known to the history of the art.

We do not assume that the principles adopted in the New York tunnel should be applied here in their elaborate entirety. We recognize that there are certain differences in the conditions under which the two works are being respectively prosecuted.

There is a difficulty in the administration of the work here which does not obtain in regard to the New York work, and that is the fact that the contract under which the work here was let was predicated upon an assumed normal section, based in turn upon theories of Capt. Hoxie as to the nature of the ground to be dealt with, which experience has shown to be largely fallacious; whereby adherence to to the normal section was found impracticable.

Under the contract but two sections were distinctly contemplated, 1st, the normal section of 82¼ square feet area, and 2nd, the regular timber section of 30 square feet area.

The section ordered by Capt. Symons in his letter of May, 1885, was intermediate between the two, and was the result of conditions not definitely provided for when the contract was made. In such an emergency it was to be expected that the section established as standard would be the smallest practicable, in view of the requirements of the contract as a whole. So that the only question in the premises is as to the proper definition of the terms "smallest practicable" in engineering practice. Capt. Symons evidently dismissed from consideration the requirements of the contract, which relates to the proper securing of the arch, and considered only the introduction of the arch itself. In our former communication we described the section thus determined by Capt. Symons as impracticable, and not in accord with current practice. And we respectfully suggest that the practice in the great work now going on in New Yock, the official delineation of which is herewith submitted, fully sustains our position.

Very respectfully,

BECKWITH & QUACKENBUSH.

[Committee No. 152.]

XX⁵.—*Exhibit C.*

GEORGETOWN, D. C., *Mch. 7th*, 1887.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., etc.:

DEAR SIR: In our communications of Jan'y 19th and Feb'y 17th relative to the standard lining section of the tunnel, we omitted to call your attention to certain points which we consider material, and which we herewith respectfully submit for your consideration.

When Capt. Symons ordered that a section of 109.67 square feet area * * * that which would be exactly circumscribed by the exterior line of the brick arch * * * we objected to it on the ground that it was impracticable and did not involve proper recognition of the requirements of the contract as a whole. Our objection was not entertained. In fact, the enlarged section was not then ordered to be taken out in ground which, though plainly requiring lining, did not require timbering, but we were directed to proceed with the normal section of 82¼ square feet. Having completed the principal part of the excavation upon the normal section, we were then compelled to go over the whole ground again, wherever lining was ordered, and trim from the roof, sides, and bottom sufficiently to admit the arch and its necessary backing.

When work was resumed under your administration, in the remaining headings between Champlain avenue and Howard University, you directed the lining section to be taken out at first attack.

This method not only saves the trouble and expense of going over the ground a second time, but also enables us to make a neater and more uniform section than was possible under the former practice, whereby the work is made more economical, both to the Government and to ourselves. But, unfortunately, the bulk of the work had been done under the system pursued by Capt. Symons, and we are now going over that ground a second time at great loss and inconvenience.

The language of the contract, with reference to the cross-section, is as follows:

"The cross-section of the tunnel will be rectangular, eleven feet wide by seven and one-half feet high, except where lining is required, when the cross-section of excavation will be increased to such limits as the United States engineer shall indicate."

This language clearly implies, 1st, that it was the duty of the engineer to decide at once as to the requirement of lining whenever such ground was encountered; and 2d, that upon such decision it was his further duty to prescribe a section that would admit of lining with all its incidental requirements as stipulated; so that we could take it out at first attack, and thus avoid the necessity of re-excavating for enlargement.

In support of this position we have only to appeal to your own practice since you have been in immediate charge.

It requires no argument beyond your own observation to convince you that the practice above noted, whereby we are compelled to go over the same ground twice, operated very greatly too our disadvantage, compelling us to be accountable for conditions beyond our control, and imposing upon us difficulties which a fair and just construction of the terms of the contract would have avoided from the start.

The effects of this practice can not now be wholly remedied.

But a partial rectification can be made by allowing a standard section in excavation, based upon current engineering practice in similar cases, as requested in our previous communications.

Very respectfully,

BECKWITH & QUACKENBUSH.

[Committee No. 153.]

XX^{6}.—*Exhibit D.*

GEORGETOWN, D. C., *May 26th*, 1887.

Gen'l D. C. DUANE,
Chief of Engineers, U. S. A.:

SIR: Pursuant to our verbal communication made to you May 25th, and in accordance with your permission, we herewith transmit copies of the papers pertaining to our application to Major G. J. Lydecker for a tunnel section in rock not requiring timbering (a section having been prescribed by Capt. Thomas W. Symons May 6th, 1885, which exactly circumscribes the brick-masonry lining of the tunnel), which would be just to both parties to the contract, which would be in accordance with the customs in such cases, and the universal practice of engineers upon the tunnels built throughout the country, and be in accordance with the spirit and intent of the contract.

Major Lydecker, in reply to our communications, said verbally that the Government was paying us for all the excavation needed, and he would not take the responsibility of increasing the area of the section prescribed by Capt. Symons, and this is, in brief, the status of the matter at this writing.

We desire as briefly as possible to give you a history of the work from its commencement to the present time (so far as our communication with it is concerned).

We began the work of sinking shafts on Dec'r 12th, 1883, and of driving tunnel Feb. 15th, 1884. The work of tunneling proceeded with the normal section 7½ by 11 feet until bad ground was met with, and July 10th, 1884, instructions accompanied by diagrams providing for timbering the tunnel and lining it with concrete. On Aug. 12th additional sections were furnished, which provided for different forms of construction. On Nov. 5th the plan of lining the tunnel with concrete was abandoned, and it was ordered lined with brick, an outline section being furnished showing the plan of the brick-work, and on Nov. 10th a plan of the brick masonry for lining tunnel was furnished us; prior to this time we had been excavating a timber section for concrete lining, where the nature of the ground made it necessary, at all other points the excavation was taken out to the normal section 7½ by 11 feet, as provided in the contract. On Dec. 17th, 1884, we were furnished with lines and grades, and ordered from that date to run our own lines and grades and be responsible for them; that after that time the Government engineers would simply check them to see if they were correct. On Dec. 29th, 1884, we were notified that we were taking out tunnel larger than the contract required, the section required being 7½ by 11 ft. (This ground has since been lined with brick masonry.)

On Jan. 14th, 1885, points and grades were given us for lining in Champlain avenue with brick, and designating the stations; and on March 4th tunnel lining with brick was commenced at Howard University, and on March 16th in the Champlain avenue west heading; on May 6th, 1885, Captain Symons prescribed the section of excavation to exactly circumscribe the brick-work, and on August 10th, 1885, he ordered that no brick-work be built, except where absolutely necessary, and the tunnel drift reduced to the normal section, and the work was continued under this order until Jan. 30th, when it was suspended and an order issued to continue the pumping, the rate being fixed at $35.00 per day, the bare cost to us being over $48.00 per day.

The work remained suspended until August 20th, 1886, when we again organized a force and cleaned out the fallen rock, and began the work of driving the headings on August 30th, 1886, and the work of lining the tunnel was resumed Oct. 11th, 1886, Howard University drift, and Nov. 4th, 1886, in Champlain avenue west, and the work of enlarging the tunnel from the normal section to section to admit of brick lining was commenced Nov. 1st, 1886, and the whole work has continued without interruption until the present time.

The monthly estimate for the month of November, 1886, showed so great a difference between the computations of our own engineer and the quantities paid for by the Government, that we made inquiries of the tunnel engineer as to the cause, and were informed that we were estimated for all enlargement of tunnel from the normal section to lining section in accordance with the section prescribed May 6th, 1885; we then appealed to Major Lydecker, and afterwards put the substance of our appeal in writing, with the result as stated before, made May 24th, '87.

In the month of July, 1884, we were estimated and paid for rock removed outside the normal section, at the rate of $1.50 per cubic yard, and although we showed that the price fixed by the engineer, which the contract says shall be a fair one, was not sufficient to cover the bare cost of loading and removing to the surface, no relief was accorded to us.

We have, therefore, at this time, this condition of affairs, and under it we are carrying on our work:

1st. We are required to run our own lines and grades, and are held responsible for them.

2nd. We are required to take out rock outside the section fixed, for $1.50 per cubic yard.

3rd. A section has been prescribed which will exactly admit the introduction of the brick masonry.

4th. We are enlarging the tunnel, where ordered, after it has once been taken out to the normal section of 7½ by 11 feet.

5th. We have protested and applied for relief thus far without success.

We are advised that the contract for this work is very plainly drawn, and any ordinary construction of its provisions would not work an injustice to either party to it, and that nothing in it contemplates an injustice to the contractor, if justly and equitably carried out. Major Lydecker says that with questions of equity he has nothing to do, and therefore we appeal to you to do us exact justice.

We ask for nothing but what we believe we are justly entitled to. The rulings made take from us the profit which should reward our efforts, and we therefore respectfully ask that you will, as soon as possible, give the subject your consideration and decision.

Very respectfully,

BECKWITH & QUACKENBUSH.

P. S —The diagrams of sections are in Major Lydecker's possession. As the papers explains them, we have not asked him for them, believing you will understand them from the description; but should you require them we can procure them for you.

[Committee No. 154.]

XX¹.—*Letter of Major Lydecker to the Chief of Engineers.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, October 28, 1887.

The CHIEF OF ENGINEERS, U. S. A.,
Washington, D. C.:

SIR: I have the honor to submit the following remarks in relation to the communication of Messrs. Beckwith & Quackenbush, dated October 17, 1887, referred to me by indorsement of the 27th inst., though my report of July 13, 1887, in relation to this claim, leaves but little opportunity for further remark.

The spirit of the specifications which control on this work (and not current engineer's practice, or the practice on the New York aqueduct tunnel) is that the contractors shall be *paid* for excavation to certain lines, the normal rectangular section (7½ x 11) in one case, and the outline of the masonry arch, side-walls, and invert in the other. It is recognized that to reach these limits the excavation will extend beyond them, but the specifications do not contemplate payment for such exterior excavation. This fact is not made apparent in the limited quotation from the specifications made herein. It must be quite evident that the extent of this outside excavation is largely dependent upon the care and skill of the contractors.

The contractors were advised of this ruling as early as November 5, 1884. The quotation herein from Capt. Symons' letter of May 6, 1885, is incomplete in omitting the final clause of the paragraph, viz, "in accordance with previous decisions."

The contractors state, "When Capt. Symons' order *began* to take effect we appealed to Major Lydecker under date of January 19th, 1887," etc. In fact the work of lining was in progress at the date of his order, and the amount of brick lining that had been actually put in place and paid for up to the end of January, 1887, was 3,525 cubic yards, or about one-third of the entire amount placed up to the present time, viz, 19,891 cubic yards. Therefore, the first appeal from Capt. Symons' ruling was not presented to me when "it *began* to take effect, but more than two years after he made it; in the meantime this ruling had been the basis of estimates submitted to Congress, published in annual reports and special communications familiar to the contractors, was in full force at the time they entered into their supplemental articles of agreement having special reference to lining, dated October 18, 1886, and they had without protest placed and been paid for lining aggregating in value about $65,000.

The length of tunnel lined to date is 8,767 feet; the claim of $5.89 per ft. for increased compensation presented by the contractors herein, therefore, amounts to $51,637.63. The appropriation being about exhausted, the work of lining under existing contracts has been discontinued.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 155.]

Y Y.—*Letter of Chittenden Brothers' attorney relative to claim for cement, etc.*

WASHINGTON, D. C., *October* 31, 1887.

Hon. WM. C. ENDICOTT,
Secretary of War:

SIR: I have the honor to recall my recent interview with you in respect to the claim of Chittenden Bros. for extra compensation for cement supplied under their contract for the dam at the Great Falls of the Potomac.

Previous to said interview I had filed a brief in the matter, which I was informed had been referred to the Chief of Engineers for report. You kindly said that upon the receipt of the said report I should be given opportunity to inspect it, and also to close the case in behalf of my clients.

May I not ask that when said report is received I may be advised of that fact?

I am, very truly,

R. H. THAYER,
Attorney for Chittenden Bros.

[Third indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
November 18, 1887.

Respectfully returned to the Secretary of War, and attention invited to the second indorsement to 4629-a, War Depat., 1887, and the report therewith.

It appears from the papers in the case that the contractors, Chittenden Bros., were, by the terms of their contract, bound to furnish a cement which must be equal to the best brand of Cumberland cement, and must show a certain tensile strength. It must be considered that the cement should equal the requirement in both respects, viz, that is, it must equal the best brand, &c., and it must have the tensile strength demanded. Should it fall below the requirements in either respect it had necessarily to be rejected, and the contractor was bound to make up the deficiency and not the United States. It appears that the cement came up to the requirements in neither respect.

This cement was decidedly inferior to cement "of the same brand in use on other parts of the work." That they should not have cement equal to other cement of the same brand must, then, be ascribed to their own neglect; and for that neglect they now claim that the United States and not themselves shall pay the penalty. It further appears that the tensile strength required by the officer in charge was an average of tests made in the fiscal year just ended, when the specifications were drawn up. Now, even if the brand had deteriorated at a later date than that of the specifications, and the contractors had supplied the best of the brand at the latter date (which it is claimed they did not), the requirement as to tensile strength was still binding.

The intent of the specifications was, not that use might be found for the product of certain cement works, but that a mortar of satisfactory quality should be obtained.

With reference to the claim for 59 barrels of Portland cement, it can not be admitted that it could have deteriorated as alleged; and it is noted, too, that proof of its being a total loss is not furnished.

Reference is invited to pages 10, 11, 12, and 13 of the "brief for claimants," inclosure 1 of 4163–a, War Dept., 1887. Without knowledge of the facts, it would be inferred that the contractors had furnished cement of the average tensile strength of 5[illegible] pounds, which they seemed to have understood as that pertaining to the "best brand of Cumberland cement;" the fact is, that the strength of the cement furnished did not test to 80 per cent. of that strength.

The brief lays stress on the statement that when objection was made to the cement furnished "the contractors expressed their willingness to supply any other brand the engineer might designate;" to which it is replied, that the responsibility of supplying cement of the standard rested on the contractors, and it was no part of the duty of the engineer to indicate acceptance of cement in advance of test at the work.

J. C. DUANE,
Brig. Gen., Chief of Engineers.

[Committee No. 156.]

A).—*Copies of letters to and from contractors (Beckwith & Quackenbush) touching defective workmanship or material, or failure on the part of contractors to comply with their contract. (Office Washington Aqueduct, November 20, 1888.)*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., March 18, 1884.

BECKWITH & QUACKENBUSH,
Washington, D. C.:

GENTLEMEN: It is reported to me that the timbering in Champlain ave. shaft is defective in there not being dividers to the three lower sets of timbers, and that these should be put in at once, as there is a vein of soft rock extending across the east end of the shaft.

You are requested to have these timbers put in.

Your attention is also called to the fact that work on the east shaft progresses very slowly, and you are requested to increase your force there and push other work with greater rapidity.

Very respectfully,

THOMAS W. SYMONS,
Lieut. of Engineers, Superintending Engineer.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., May 15, 1884.

Messrs. BECKWITH & QUACKENBUSH,
3003 *M st., Washington, D. C.:*

GENTLEMEN: I am compelled to call your attention to the very slow and unsatisfactory progress which is being made in the tunnel headings driven from the Rock Creek and Foundry Branch shafts. The rate of progress is less than one-half that prescribed in your contract, and which it is necessary should be made in order that the tunnel shall be completed in the time specified in your contract.

At the present rate of progress it will take more than another year beyond this specified time to complete the tunnel.

You must see the necessity of taking measures for the more rapid prosecution of the work.

Very respectfully,

THOMAS W. SYMONS,
Lieut. of Engineers, U. S. A., Superintending Engineer.

GEORGETOWN, D. C., *May 15th*, 1884.

THOMAS W. SYMONS,
Lieut. of Engineers, U. S. A., and Superintending Engineer of Washington Aqueduct Tunnel, Georgetown, D. C.:

DEAR SIR: Yours of this date is received, and in reply will say that we are making a strong effort to comply with the specifications and accomplish the required rate of progress required by them. We have been considerably annoyed by our men leaving

us and have just secured a full complement of men in the Rock Creek headings, and we feel confident now in driving those headings faster than the specification requires, also one heading of Foundry branch. The west heading of that working is in very hard rock and breaks badly, and we have ordered an extra quality of explosive to use in it, and expect to receive it to-morrow, when we hope to increase the progress in that end. We have succeeded in getting our air pipes nearly tight, the leaks in them having delayed us considerably. There are now indications that we are nearly through the hard vein of rock in west heading of Foundry branch, which will aid us materially in that working. One thing you may rest assured of, that we will drive this work to the extent of our ability, which we believe is as well as any one can do. We do not consider that we have our work fairly under way as yet.

Yours, very respectfully,

BECKWITH & QUACKENBUSH.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., June 9, 1884.

Messrs. BECKWITH & QUACKENBUSH,
3003 *M street, Georgetown, D. C.:*

GENTLEMEN: I have to call your attention to the extreme slowness with which the work is being carried on at the shaft in the new reservoir. Only 2 feet have been made during the month and for a number of days nothing has been added to the depth of the shaft.

The progress of the work must not be made to depend upon a pump working badly. If any further delays arise from this cause you will be required to put duplicate pumps in the shaft. Such accidents from defective machinery as cause delay for from four or five days at a time should be foreseen and guarded against.

It is hoped that the Champlain avenue shaft will be soon in a condition that will allow of work being carried on in the tunnel in a satisfactory manner.

Very respectfully,

THOMAS W. SYMONS,
Lieut. of Engineers, U. S. A., Superintending Engineer.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., September 20, 1884.

Messrs. BECKWITH & QUACKENBUSH,
Washington, D. C.:

GENTLEMEN: On the 12th of August a letter was written you with diagrams of tunnel cross-sections where lining of masonry is required.

The height required for this masonry lining above the bottom grade of the tunnel is 12 feet in the one case and 11 feet 3 inches in the other.

In the west heading from Champlain avenue you have put the timbering in through the soft ground at a height of about 9½ feet from the bottom of the tunnel to the bottom of the cross-timbers. It will be impossible to get in the masonry lining required below these timbers in any way that I can see.

I call your attention to this, as it seems advisable to put in timbering of such dimensions that the masonry lining can be put in without disturbing it.

Otherwise, it seems to me that it will be necessary to take down the timbering and replace it with that of proper dimensions in order to get the proper lining in.

I would also call your attention to the lack of care in some of the headings in keeping lines and grades.

The west Rock Creek heading is very considerably below grade and must be raised.

Very respectfully,

THOMAS W. SYMONS,
Captain of Engineers, U. S. A., Superintending Engineer.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., September 25, 1884.

Messrs. BECKWITH & QUACKENBUSH,
Washington, D. C.:

GENTLEMEN: Inspectors report a very inadequate air pressure at the drills, delaying the work very materially.

It is also reported that in the Foundry Branch drifts the ventilator boxes are very distant from the headings and should be extended.

I trust that these matters will be attended to.

Very respectfully,

THOMAS W. SYMONS,
Captain of Engineers, U. S. A., Superintending Engineer.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., December 29, 1854.

Messrs. BECKWITH & QUACKENBUSH,
Washington, D. C.:

GENTLEMEN: I wish to call your attention to the fact that the specifications to your contract call for a tunnel 7½ feet high and 11 feet wide. In a great many instances this cross-section is exceeded and the tendency seems of late to be towards making the tunnel considerably larger than is called for by the specifications. This in rock which is of such a nature that by exercising proper care a tunnel of any desired size could be driven in it. The enlarged section in the great majority of cases is believed by this office to be due entirely to the excessive charge of powder used in deep holes located so as to break the heading larger.

There is no objection on the part of this office to your enlarging the tunnel within small limits in good rock if you see fit to do so at your own expense. But it must be distinctly understood that in all ordinary cases no payment will be made for rock excavated beyond the prescribed limits, and no claim will be favorably considered by this office for the same, or for its removal from the tunnel, either for the tunnel already driven or that which may be driven in the future.

Very respectfully,

THOMAS W. SYMONS,
Captain of Engineers, U. S. A., Superintending Engineer.

GEORGETOWN, D. C., *Jan.* 5, 1855.

We, the undersigned contractors for constructing the Washington Aqueduct tunnel, would make the following statement of some points of difference which have arisen between the contracting parties in the progress of the work, and which we claim the specifications of our contract do not clearly cover, or are construed by the Government party to our detriment and loss.

Conceiving that the Government has no desire or inclination to use its power to deal otherwise than fairly and justly with its citizens, we would respectfully request that the following points at issue, as well as others that may arise, may be fairly and equitably adjusted:

I. Order of December 17th, the compliance with which required us to do instrumental work and make us responsible for same, the statement is made that this order is justified under a clause in the "specifications," which recites it is to be expressly understood that payments on account of the several items included in the proposals hereto attached will be in full for all work and material required to accomplish and complete everything required by these specifications. Our understanding of this clause is that it refers simply to any work or material which may enter into construction of tunnel, and has not the slightest reference to running lines or grades or doing or causing to be done any instrumental work.

II. The specifications provide for the payment of rock excavation in tunnel outside area lines as follows, and the following is the words and language made use of in the specifications in relation to this item: "In all cases the prescribed section must be preserved, and no payment will be made for material excavated outside the prescribed lines and grades, but all loose and insecure rock outside these lines, whether resulting from natural causes or from the prosecution of the work, that may be likely to fall into the tunnel, must be removed. In cases where the necessity for such removal is not occasioned by the shattering of the rock by blasting, but is due to the natural seams, cracks, or fissures, a *fair price* will be paid for removing the same; if the necessity results from the operation of blasting, the removal must be made at the expense of the contractor; all questions arising in this connection will be determined by the United States Engineer, and the price to be paid for removal will be fixed by him, and his decision shall be accepted by the contractor as final." A considerable quantity of work has been done by us under this clause, and a portion of the same estimated at one dollar and fifty cents per cubic yard, a price which we claim is not a *fair price*, it being the prevailing rate for rock excavation in open cuts and other

work of like nature above ground, the ordinary, common, and fair price for this work being $4 per cubic yard.

III. In excavating the east connecting shaft, the specification provided that to a point where solid rock should be found the shaft should be excavated to a size of nineteen feet square; from that point to grade of tunnel the shaft should be fourteen feet in diameter. The shaft was excavated to solid rock, and an attempt was made to cut a collar upon the rock above the fourteen-foot circle, but rock broke so badly that it was decided to go to bottom of tunnel to start brick lining. We are entitled to payment for the expenditure of labor and material in cutting collar over fourteen-foot circle and for excavation of material to outside dimensions of shaft as now constructed, but this has not been allowed us, and we claim that we are entitled to the amount of cost of any work which can not be done by drilling and blasting, the common methods used in removing rock in such work.

IV. Certain portions of tunnel require lining. Sections here and there have been ordered lined, leaving spaces which in some instances, in our judgment, will require lining. This work will be expensive and also dangerous to work joining, by reason that tunnel will have to be enlarged and adjoining work protected from blasting. We therefore desire that, beginning at the shafts, it shall be decided as the work of lining progresses toward the headings how much of tunnel shall be left without lining, so that we shall not be obliged to go over same ground twice.

V. Specifications furnish ground for purpose of storing material from tunnel. We claim that the ground specified should be free from obstacles preventing full and complete use of same for purposes indicated, and any expense incurred by contractors in trestling streams and building culverts to carry same under embankments should be re-imbursed by Government.

Very respectfully,

BECKWITH & QUACKENBUSH.

To G. J. LYDECKER, Esq.,
Major Engineers, U. S. A., and Engineer Commissioner District of Columbia, Washington, D. C.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., January 7th, 1885.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

SIR: I have the honor to return herewith communication of Beckwith and Quackenbush, referred to me by your indorsement of the 6th inst., with the following report:

In regard to the first point made by the contractors it seems to be fairly within the power of the engineer in charge to compel the contractors to do such work as to him seems necessary to have the contract carried out in the best and most satisfactory manner possible. The requirement that the contractors should carry on their work in the direction plainly marked and given them seems entirely reasonable, and I consider that this office can no more be called upon to be continually giving lines and grades than it can be called upon to do any other work necessary to carry out the contract.

It is always best to have an undivided responsibility, and the adoption of this rule will attain this end and put a stop to all questions which might arise if the responsibility was divided by one party being responsible for giving lines and grades and the other for keeping them.

I believe also that the work can be better systematized in this way, and that more effort will be made on the part of the contractors to keep their lines and grades if there is no possibility of the responsibility being thrown on another party.

II. In regard to the rate of pay for the removal of rock rendered necessary by natural seams, cracks, etc., and not due to blasting, I will say that the price is meant to simply cover the cost of removal from the tunnel and not for any drilling or blasting, which is not supposed to be necessary under the circumstances.

I had a number of careful estimates made into the cost of removing the muck and débris from the tunnel, and the price of $1.50 per cubic yard was fixed upon from these estimates and is in excess of them all, and I believe fully and more than fully covers the cost of removal. The fact stated by the contractors that $1.50 is the prevailing rate for *rock excavation* in open cut is sufficient proof that the same rate is ample for the *simple removal* of loose and fallen rock from the tunnel to the surface.

As far as the work has progressed all the allowance which is deemed proper has been made the contractors under this clause of the specifications.

III. In regard to the east shaft the contractors' claim to extra payment for time and labor expended in cutting collar over 14-foot circle seems untenable.

When the solid rock in this shaft was reached and the shaft continued in it, it was found that owing to the nature of the rock and the rough methods of working it, a collar could not be cut and proper foundation prepared for the masonry lining of the shaft above without a great deal of extra labor.

At the solicitation of the contractors the plan was changed, and it was decided to excavate the shaft in the rock a little larger, and carry up the brick-work from the bottom. This has been done, adding largely to the expense of the shaft.

The labor expended in cutting the collar, etc., was such as could and should have been foreseen, and was expended in carrying out the provisions of the contract, and any claim for extra compensation therefor can not be for one moment considered tenable by me.

In the estimate for this shaft the contractors have been paid as follows:

From the surface to the solid rock payment has been made for the size of shaft as provided for in the contract; from the solid rock where the 14-foot circle should have been commenced to the roof of the tunnel payment has been made for a circle 19 feet in diameter, which it is believed is a liberal and full allowance for the work done. If the contractors will state the ground of their dissatisfaction with the measurements fully, and it be found that they are wrong, they will be promptly corrected by this office.

If, in the prosecution of the work, it be found necessary at any time to do the work by other than the common methods of drilling and blasting it must be regarded as work incident to the contract, compensation for which is included in the general prices paid for the various items of the work.

The specifications prescribe the proper steps to be taken in case of a modification of the contract, extra work, claims for extra allowance, etc., when the steps are not complied with by the contractors, they can not, according to the terms of the contract, be considered or allowed afterwards.

IV. As far as possible, the contractors' wishes in regard to lining being defined as the work of lining proceeds inward from the shaft will be carried out. But this office will not be bound in any way to make such definition final and not subject to revision.

V. The contractors, it is inferred, took their contract with a full knowledge of the natural features of the locality, and agreed to do all work necessary to carry out their contract for the prices stated in their contract.

These prices cover all their routine expenses, and all incidental expenses as well, under which head must come such work as trestling, &c., in order not to block up a natural water-course with débris from the tunnel.

The claim for re-imbursement for such work I do not consider in any way a proper one.

Very respectfully, your obedient servant,

THOMAS W. SYMONS,
Captain of Engineers, U. S. A., Superintending Engineer.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., January 10th, 1885.

Messrs. BECKWITH AND QUACKENBUSH,
Washington, D. C.:

GENTLEMEN: I must again call your attention to the continued highly unsatisfactory rate of progress of the work for which you have the contract.

You have never yet, in any one month, attained a rate of progress as great as the minimum rate called for by your contract. Last month your average daily progress in drifting was 5.26 feet, and at the rate work is going on the tunnel can not be completed in excavation until August, 1886, more than a year beyond the time specified for the completion of your contract.

Since the pressure-gauges have been put on the air-pipes in the tunnel it is found that the average pressure at the drills is about 42 pounds, varying from 30 to 50 pounds per square inch, whereas you are required by your contract to supply a pressure of not less than 60 pounds per square inch.

Your contract, and the specifications thereof, require that the air shall be taken from the shaft to the headings in iron pipes of not less than 4 inches in diameter. In several of the drifts two-inch iron pipes have been used in direct violation of the terms of your contract, and without any authority from this office.

You are hereby directed to remove from the tunnel the two-inch pipes used for conveying the compressed air and substitute therefor the four-inch pipes required by your contract. This is one of the items which account for your slow rate of progress.

There are several other points which in my opinion if properly attended to would insure a much more rapid rate of progress in the tunnel. One is the lack of proper and sufficient superintendence, particularly on the eastern portion of the line where it has been and is most needed.

A great deal of time is lost for the lack of a proper supply of tools, spare parts, &c., for repairing and keeping in order the drilling machines in each heading. A tool-chest, with plenty of tools and spare parts, should be kept at each heading.

Much time is also lost in the endeavor to use worn-out tools, hose, &c. A variety of timbers of all sorts which may be useful in the tunnel should be kept on hand, so that no delay may occur when timbering is required.

I believe also that a much more rapid rate of progress can be attained by using two drills on one column and thus making use of three and four drills in each heading. In this way more rock can be drilled and blasted out. Greater exertions will then have to be made to remove the muck and I believe that this can be done more efficiently by providing a more liberal supply of cars and working the mucking force in 8-hour shifts and impressing it upon the men that the shift is made shorter in order that they may work harder during its continuance.

I desire particularly to call your attention to the drifts from the east shaft and Champlain Avenue shaft. These are the longest now remaining to be driven and progress in them is the slowest.

It is desired that you put your very best men at these shafts and use every endeavor to expedite the work at them, even to the marked detriment of the remaining work. This is particularly desired in the drift from the east shaft. The same rate of progress in this drift as in the others will leave this incomplete many months after all the others are done, and this would be much to your detriment and cost.

I think you will see that it will be largely to your interest as well as for the interest of the work to push this drift even at largely increased expense in order not to allow it to delay the completion of the entire work more than is possible.

Very respectfully,

THOMAS W. SYMONS,
Captain of Engineers, U. S. A., Superintending Engineer.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., January 15, 1885.

Messrs. BECKWITH AND QUACKENBUSH,
Washington, D. C. :

GENTLEMEN: In the east drifts of Rock Creek and Foundry Branch the excavation of the tunnel from the points established for your guidance has been very badly carried, in fact the line has been disregarded entirely, and you are required to go back at a point where the departure takes place and excavate to the required width and line in both these headings.

The center line in east drift, Foundry Branch, is cut off for a distance of nearly 100 feet, being two and three feet north of the north side of the tunnel excavation. (See sketch enclosed.) In a distance of about 25 feet from the point established by Mr. Coryell, the north side of the excavated tunnel strikes the center line, and at a distance of 50 feet the center line is between 7 and 8 feet out of line. This can not be overlooked, but must be remedied at your expense.

If it is afterwards found necessary to line this portion of the tunnel you will be required to fill in the enlarged excavation outside of the usual limits with dry stone packing at your own expense.

Material from the drifts at Foundry Branch have been dumped in the creek and filled the creek to a considerable depth. You will please have this removed and avoid a re-occurrence.

The roof of the entire tunnel as far as excavated should be carefully gone over and all loose rock and all rock that has a metallic sound under the hammer should come out. These measures should be taken for the safety of those working therein.

I have also to inform you that the reports of the inspectors show a progress during the first 15 days of this month in the drift from the east shaft of only about 42 feet.

You have been fairly warned concerning this unsatisfactory progress in this drift, and must not be surprised if an annulment of your contract speedily follows, unless a much greater rate of progress is attained.

Very respectfully,

THOMAS W. SYMONS,
Captain of Engineers, U. S. A., Superintending Eng'r.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., February 13, 1885.

Messrs. BECKWITH AND QUACKENBUSH,
Washington, D. C.:

GENTLEMEN: You have been repeatedly ordered to commence the work of lining in the tunnel driven from Champlain avenue and the reservoir shafts, and have not done so.

I now emphatically repeat the order to you in this form and must insist that the work of lining in the west Champlain avenue drift and the drift from the reservoir shaft be commenced without delay.

Very respectfully,

THOMAS W. SYMONS,
Captain of Engineers, U. S. A., Superintending Engineer.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., May 6, 1885.

Messrs. BECKWITH AND QUACKENBUSH,
Washington, D. C.:

GENTLEMEN: I must again call your attention to the slow progress on that part of tunnel where the greatest amount remains to be done. The progress in the east Champlain Avenue shaft in April was 110 feet, and in the east reservoir shaft 118 feet—far less than in any of the other headings.

The desirability of greater progress in these headings must be apparent to you, and any method by which this progress can be increased will result in material advantage to you as well as the citizens of Washington.

I am of the opinion that progress can be materially increased in these headings by running three shifts of workmen in the 24 hours instead of two, and this I strongly recommend to you to do and at the same time to put your very best men and machines in these headings.

Very respectfully,

THOMAS W. SYMONS,
Captain of Engineers, U. S. A., Superintending Engineer.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., September 5th, 1885.

Mess. BECKWITH AND QUACKENBUSH,
Contractors, Washington, D. C.:

GENTLEMEN: It is found that in driving the tunnel in those portions where lining will be required and the large section is carried, that the area is not kept down properly to the size required for lining.

The large and excessive area is due in the majority of cases to the careless and erroneous location of holes and overcharges of explosive. In consequence, a greatly increased cost for the dry-stone packing of the lining is thrown on the Government. You will please take the necessary steps to correct this condition of affairs. If the excess in the area of the excavation required for lining can not be kept down any other way, it will be necessary to drive the tunnel to the normal section and enlarge it afterwards.

Very respectfully,

THOMAS W. SYMONS,
Captain of Engineers, U. S. A., Superintending Engineer.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., December 17, 1885.

Messrs. BECKWITH AND QUACKENBUSH,
Washington, D. C.:

GENTLEMEN: I am informed that one of the causes of slow progress in the east heading from Champlain Ave. shaft, is the fact that the blacksmiths employed are not skillful in tempering the drills.

Your own interests as well as those of the Government require that the best and most skillful workmen be employed in this heading, and your attention is called to the matter and a change in the blacksmiths, at present employed, recommended.

From observations made during my recent trip to New York, I am convinced that greater progress can be made in this heading by using the larger sized drills with greater air-pressure.

It is desired that you would consider the advisability of increasing the air-pressure to 80 pounds at the drills, and using larger drills in this heading.

Very respectfully,

THOMAS W. SYMONS,
Captain of Engineers, U. S. A., Superintending Engineer.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., August 1, 1887.

Messrs. BECKWITH & QUACKENBUSH,
Washington, D. C.:

GENTLEMEN: I am directed by Major G. J. Lydecker, Corps of Engineers, to inform you that while in enlarging the tunnel in those sections which are to be lined with arch and side walls you are to conform to the lines of the tracing furnished you; in those sections which have already been excavated for an invert, the side walls will be given such a height as to keep the springing line of the arch on a plane parallel to the bottom of the tunnel.

Very respectfully, etc.,

C. McD. TOWNSEND,
1st Lieut. of Engineers, U. S. A., Supervising Engineer.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C. July 12, 1888.

Messrs. BECKWITH & QUACKENBUSH,
Washington, D. C.:

GENTLEMEN: I am directed by Major G. J. Lydecker, Corps of Engineers, to inform you that if any further attempts are made either to substitute dry stone for rubble masonry filling in the lining of the tunnel or to leave unfilled cavities in the backing, your contract will be annulled and the work completed by the United States.

You are also directed to introduce power drills in the east heading Foundry Branch shaft without delay. While arranging your pipes, you will increase your force drilling in that heading until your rate of excavation shall be 20 feet a day, taking the men from Champlain avenue shaft for that purpose, if necessary, to reduce the force at any other place. As your attention has been repeatedly called to this subject, the annulment of your contract will be recommended if your force is not immediately increased.

Very respectfully,

C. McD. TOWNSEND,
1st Lieut. of Engineers, U. S. A., Supervising Engineer.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

DEAR SIR: Your letter of the 12 instant is at hand. Referring to the first matter mentioned, we have to say that if attempts have been made to substitute dry packing for rubble masonry filling or to leave cavities unfilled, it has been without our knowledge and contrary to our most stringent instructions. We are fully aware that such action would be an infraction of the contract, which it is our purpose to execute faithfully.

As to the introduction of power drills in Foundry Branch east, we respectfully call your attention to the following facts:

1st. The power plant was removed from that section in October, 1886, upon the decision of the U. S. engineer that no farther excavation would be required there, and that the normal section, then completely excavated, would be left without lining. The decision to line this section, whereby trimming was rendered necessary, was not arrived at until long afterward.

2nd. The trimming has now reached Station 7, in Foundry Branch east, leaving 940 feet in that section to reach the portion heretofore trimmed. From the latter point, that is to say, between 19 and 32 Foundry Branch east, and the connection, it is our intention to use power from the direction of Rock Creek, and at the present rate of progress we shall reach that section in 60 days.

Had we foreseen the change of plan that has occurred, we would have left the power plant in Foundry Branch shaft. But having removed it by authority, we must now call your attention to the fact that its replacement would be attended with great expense and loss, not due to fault on our part, and moreover, in view of the comparatively small amount of work to be affected by it, could not sensibly expedite operations.

Very respectfully,

BECKWITH & QUACKENBUSH,
Contractors.

(Received July 18, 1888.)

Maj. G. J. LYDECKER,
Corps of Engineers, U. S. A.:

DEAR SIR: Your report published in the local papers of last week intimates that we have not exercised due diligence in carrying out the provisions of the supplementary contract signed May 8, 1888. This, we think, is unjust to us. From the moment the tunnel was dry we have done everything in our power to push the work of trimming and lining.

You are aware that the conditions are unfavorable to rapid progress. Much of the work has to be done piecemeal or in small portions, where it had been intended to leave the normal section without lining. This frequently impedes the progress of "mucking," because the broken rock must be removed before lining can be introduced, so that there is little use of pulling rock from the sides and roof faster than it can be mucked out. Then, again, we have to distribute the rock taken from the harder formations all along the line to meet the requirements of the specifications for rubble side-walls, and for that purpose we must keep our track clear most of the time. We can not cover up our track with muck for any considerable distance without impeding our masons, for which reason nothing would be gained by putting in an extra large drill force. Where practicable we are putting in holes in the roof and sides in advance, with a view to pulling at such time as shall be convenient with regard to the other work required. To this end we are putting on as many men as we can by continuous advertising, though we have to say that Washington does not appear to be a good labor market for mining help, and men will not come here from a distance.

On the whole, we find that about 1,300 feet of completed work per month is all we can do with the facilities afforded by the condition of the tunnel and the extent of our plant. We are, for example, working all the masons that our shaft plant can keep supplied with brick and cement. If we were to put on a heavier force of masons they would be idle some of the time for want of material. If we were to attempt to work a greater number of gangs at trimming they would get in each other's way and impede each other by pulling more rock than our track and cars can handle, besides obstructing the track with the muck.

In short, our experience teaches us that we are doing the very best we can, under many difficulties.

We need not remark that it is quite as much to our advantage as to that of the Government to complete this work with all possible dispatch. You can depend upon us to work every man and every tool that can be employed to advantage; and we think that upon close examination of our methods you will be satisfied that we can not materially increase our force without putting men in one another's way.

We have addressed a letter to Senator Allison, of which we enclose a copy. In case the Senate Committee should consult you, which will probably be the case, we respectfully ask your approval of our application for an extension of time, as you can not but be aware that it has from the first been impossible to complete the work by November 1, 1888, the limit fixed in the act approved March 30, 1888.

Very respectfully,

BECKWITH & QUACKENBUSH.
DAVIS.

(Received July 19, 1888.)

OFFICE OF BECKWITH & QUACKENBUSH,
Washington, D. C., July 10, 1888.

Hon. WM. B. ALLISON:

DEAR SIR: The urgent deficiency act, approved March 30, 1888, appropriating funds for the completion of the Washington Aqueduct tunnel, contained, among other things, a proviso requiring the work to be completed by November 1st, 1888. By virtue of the provisions of this act we entered into supplemental articles of agreement with the Secretary of War, undertaking to complete the work within the sum appropriated, the said articles containing a clause to the effect that we should do all in our power to complete the said work on or before November 1, 1888, but reserving to the Secretary the right to suspend payments after that date, unless the said limitation of time should be extended by law.

This act being approved March 30, pumping operations were immediately begun—the tunnel having filled with water during the suspension of work pending the appropriation of additional funds. Forty-one days were consumed in clearing the tunnel from the west connecting shaft to the crown of the easterly grade in Howard University shaft west, and the latter section was not fully dried until May 27.

The supplemental articles of agreement were signed on May 8, 1888, but it was not until the 27th of that month that work was fully practicable along the whole line. Work of a fragmentary character was begun on the higher levels east and west from Foundry Branch shaft on May 11th, it is true, but to all main intents we may say that full lining operations were not and could not be resumed prior to May 27, or, say, June 1st.

Since that date we have crowded the work with all possible dispatch. We have had 232 men at work trimming; that is to say, enlarging the section of the tunnel to admit the masonry arch, and 120 masons at work on the lining itself.

This is the maximum force that we can work by reason of the fact that the facilities of ingress to and egress from the tunnel for men and material are limited by the capacity of the shafts for hoisting and lowering, and also by the confined nature of the space in which work must be done.

Our experience is that, in the sense of completed work, fifty (50) lineal feet per day or about thirteen hundred feet per month is the maximum of possible accomplishment, in view of the physical limitations before referred to. At this date, eight thousand nine hundred and seven (8,907) lineal feet remain to be lined. Dividing this amount by the ascertained possible progress per month, thirteen hundred (1,300) feet, we find that it will require, at the maximum rate of work possible, seven months from July 1st, 1888, to complete the masonry lining alone. To this another month must be added for the operations of cleaning up, removing plant, filling up the intermediate shafts and perfecting the eastern and western reservoir connections to the extent required by the contract, therefore, roundly, eight months from July 1st, 1888. This estimate is net and makes no allowance whatever for unforeseen contingencies, for which the usual margin allowed by engineers is never less than ten per cent., and often, in subterranean work, more. On this basis, an additional month should be granted. A fair and reasonable calculation, therefore, would indicate the certain completion of the work in all respects by April 1st, 1888, contingencies included; while, by reason of the physical limitations before referred to, its completion by March 1st is only possible at the maximum rate of progress, and in the entire absence of any and all retarding circumstances—a state of things not likely to occur.

We therefore respectfully ask that you will use your endeavors to secure an extension of the time allowed by law for the completion of the Washington Aqueduct tunnel from November 1st, 1888, to April 1st, 1889; and that to this end you will have inserted in the general deficiency appropriation bill a clause modifying the requirement of the urgent deficiency act approved March 30, 1888, to that extent.

And if your honorable committee deem further technical or practical information necessary, we will be in readiness to respond to your summons at any time.

Very respectfully,

BECKWITH & QUACKENBUSH.
A. C. BUELL,
Consulting Engineer.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., July 20, 1888.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

MAJOR: I have the honor to submit the following remarks upon the letter of Beckwith & Quackenbush inclosing a copy of a letter to Senator Allison, in which the request is made for an extension of the time of completing their contract.

I concur in the deduction of the contractors that it is impracticable to finish the work by November 1st, 1888, but their reasoning both in the letter to Senator Allison and in that of transmittal is faulty, and the statements on which they base their arguments are incorrect.

I recommend an extension of the contract, but consider that it should be made with such restrictions to insure the completion of the work in the shortest practicable time, and I therefore call attention to some of the principal errors in these documents. They are now lining 84 feet of the tunnel a day, instead of the maximum 50 feet stated, and they could readily line 100 feet per day, and would be compelled to do so if it would diminish the time of completing the tunnel. Nor is the fact that the University shaft was not pumped out till May 27th of any moment, as that shaft will be completed by the middle of August at the latest. The factor that they select stone and use it on the tunnel for side walls accelerates rather than retards their work, as less muck has to be taken from the tunnel and less brick brought into it. The time of completing the work depends not only on the number of men employed, but more particularly on the manner in which they are distributed. Some headings have very little work to be done in them, while the east heading from Foundry Branch has to be lined throughout. The time of completion of the work is therefore not a function of the general monthly rate of progress, but of the rate of progress in this longest unlined heading, and this should be kept as high as possible. The contractors have not made satisfactory progress in this heading; it was pumped out so that it could be entered the day the contract was signed, but at the rate at which they were working when the letter to Senator Allison was written this heading would not have been

completed in a year. Better progress is now being made, but it has been necessary to suspend work temporarily in two of the short headings to accomplish it.

A rate of 20 feet per day per heading can be made, and should be insisted on in this heading, in any extension of the contract. At this rate this heading can be lined by the first of January. A sufficient force should be employed in the other headings to complete them at the same date. It is to the advantage of the contractors to finish the short headings as soon as practicable to save the expense of pumping, hoisting, etc., and to delay action in this heading, until they can blast out the rock with power drills from Rock Creek shaft. There is no objection to their working as large a force as practicable in the other headings, if the force at Foundry Branch is not reduced thereby. In extending their contract particular attention should be paid to so drawing it up as to compel a maximum amount of work in this heading.

Very respectfully, your obedient servant,

C. McD. TOWNSEND,
1st Lieut. of Engineers.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., July 19, 1888.

Messrs. BECKWITH and QUACKENBUSH,
Washington, D. C.:

GENTLEMEN: I am directed by Major G. J. Lydecker, Corps of Engineers, to inform you that the quality of brick being furnished is not up to the standard required by contract. A load of brick has been condemned at Rock Creek shaft, and a second at the east shaft. They will be removed without delay.

Very respectfully,

C. McD. TOWNSEND,
1st Lieut. of Engineers, Supervising Engineer.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., July 26, 1888.

Messrs. BECKWITH and QUACKENBUSH,
Washington, D. C.:

GENTLEMEN: I am directed by Major G. J. Lydecker to inform you that the Round Top cement used by you in the tunnel does not come up to the requirements of the specification. You will furnish as soon as practicable some other standard cement, sending specimen to this office for testing purposes. The limited amount of Round Top cement you have at the shafts can be used in the proportions of 1½ to 2 of sand if you so desire.

Very respectfully,

C. McD. TOWNSEND,
1st Lieut. of Engineers, U. S. A., Supervising Engineer.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., September 1, 1888.

Messrs. BECKWITH and QUACKENBUSH,
Washington, D. C.:

GENTLEMEN: I see by to-day's reports from inspectors that the directions given you in reference to the number of men to be employed in mucking at Foundry Branch, east heading, are not being carried out. There is reported a force of but five men working at the muck pile. The force will be doubled, five men on the day shift and five at night. This force must not be interfered with to clean foundations. If extra men are needed they must be taken from other headings.

In all headings muck will be removed to solid rock at the muck pile and the material for filling the track obtained from the foundations.

Very respectfully,

C. McD. TOWNSEND,
1st Lieut. of Engineers, U. S. A., Supervising Engineer.

[Committee No. 157.]

K.—*Copies of correspondence covering claims presented by contractors (Beckwith & Quackenbush) for extra compensation beyond that allowed in estimates by U. S. engineer. (Office Washington Aqueduct, November 20, 1888.)*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., May 6, 1885.

Messrs. BECKWITH and QUACKENBUSH,
Washington, D. C.:

GENTLEMEN: At points where timbering is required in the tunnel the allowance for excavation will be made in accordance with the enclosed sections.

Where sides and roofs are bad and posts are absolutely necessary to support the load above, as indicated in section No. 1, the allowance is full cross-section from out to out of timber, not to exceed a rectangle 14′ wide and $11\frac{2}{10}\frac{5}{0}$ high.

At points where the roof is bad and sides of sufficiently good rock, as indicated in section No. 2, the cross-section will be rectangular, 12′ wide and $11\frac{2}{10}\frac{5}{0}$ high.

It must be understood that the areas marked on these cross-sections will be allowed only at points where the timbering is actually placed and of the dimensions indicated in the cross-sections, to allow the lining to go on without delay.

In all cases where timbering is ordered it must at once be placed to the full cross-section, to avoid delay and unnecessary labor of retimbering. Unless this is done no allowance for excavation outside the outline of the arch will be allowed.

No payment for regular excavation will be made for material excavated outside the lines as specified on the enclosed sections.

In all cases the necessity for timbering will be in accordance with the judgment of the U. S. engineer.

At points where lining is necessary and the ground sufficiently firm not to require timbering, the outline of the arch in excavation only will be allowed, in accordance with previous decisions.

Very respectfully,

THOMAS W. SYMONS,
Captain of Engineers, U. S. A., Superintending Engineer.

GEORGETOWN, D. C., *January 19th*, 1887.

G. J. LYDECKER, Esq.,
Major of Engineers, U. S. A., Washington, D. C.:

DEAR SIR: By letter of Captain Thomas W. Symons dated May 6th, 1885, we were notified that a section had been prescribed or indicated for such portions of the tunnel as might require masonry lining but did not require timbering. This section was assumed to circumscribe the exterior of brick arch and no more, and its area was computed at 109.67 square feet. This action we were informed was taken from authority derived from the clause of the contract between the United States and ourselves, relating to cross-sections, as follows: The cross-section of the tunnel will be rectangular, eleven (11) feet wide by seven and one-half (7½) feet high, except where lining is required, when the cross-section of excavation will be increased to such limits as the United States engineer shall indicate.

Our experience has demonstrated that this section is impracticable for the purposes required, namely, to admit a masonry arch securely based and packed as required by the specifications. Owing to the shape of the section and the formation of the rock in which we are operating it is impossible to provide the clearance required for proper packing of masonry to secure a solid mass without breaking an actual section considerably larger than the theoretical one indicated by Captain Symons.

We do not refer to slips or extra damages due to seams and fissures in the rock, but to the actual work which we are in practice compelled by the orders of the engineers in charge and by the requirements of the inspectors to do in order to carry out the letter and intent of the specifications regarding the masonry lining and its necessary incidents.

The fact that a concrete base is required under the floor of the invert and rubble masonry packing behind the benches and spring of the arch shows clearly that an actual section larger than the theoretical one established by Captain Symons was contemplated as unavoidably incident to the proper execution of the work. In most of the area which has been decided to require lining the excavation had been completed to the normal section of seven and one-half (7½) by eleven (11) feet, and in order to prepare this for lining we have to go over the whole ground anew, at enormously increased cost, considering the amount of additional excavation allowed by adherence to Captain Symons' theoretical section.

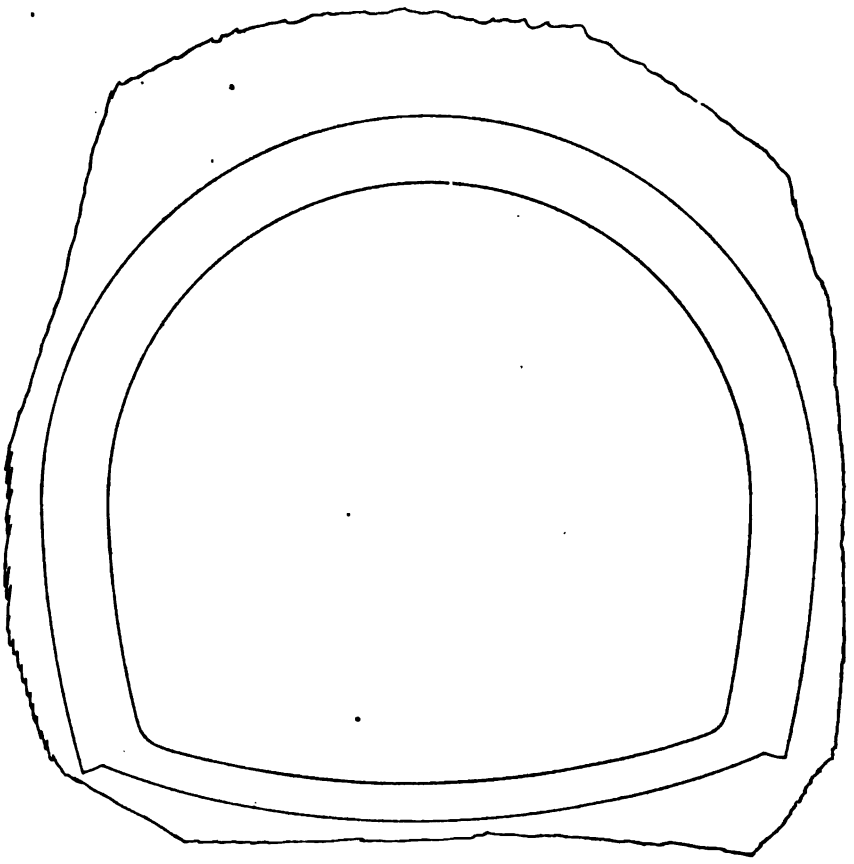
As an instance of the practical operation of this ruling we cite item in the estimate for December, 1886, where in Foundry Branch shaft (both headings) we enlarged 220 lineal feet from the normal section to that required for lining, and the estimate paid us $3.57 per lineal foot for that work, whereas, as shown by our expense roll, the actual cost to us of the same work was $16.74 per lineal foot.

We understand perfectly that a standard section must be established. We do not ask to be paid the contract excavation rates for the entire actual section removed. All we ask is that the standard section shall be determined upon dimensions which will recognize the fact that the specifications as a whole require clearance between the exterior of the brick masonry and the circumjacent rock walls.

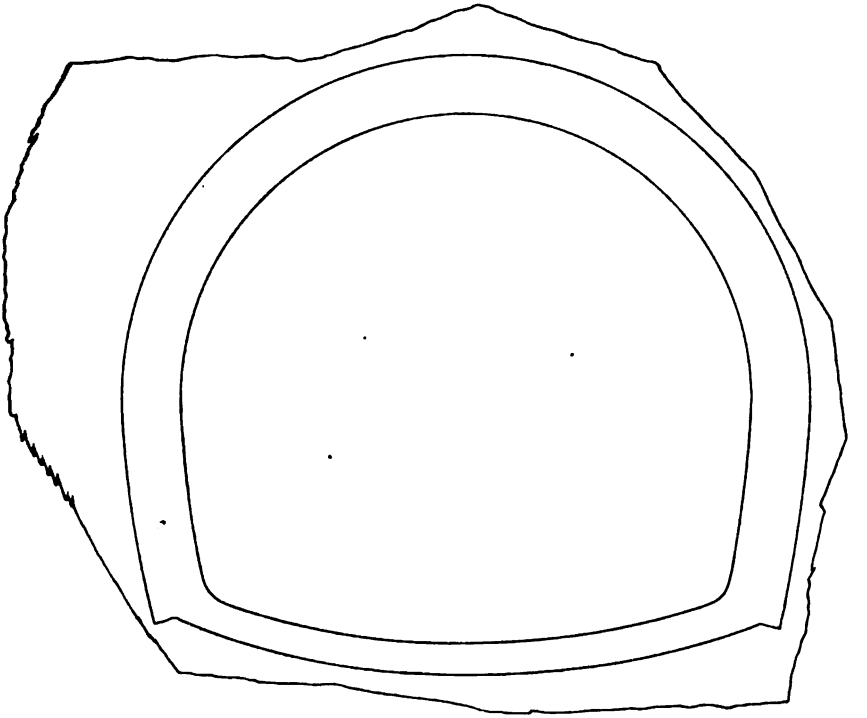
Adherence to the theoretical section indicated in Captain Symons' letter of May 6th, 1885, referred to, when viewed in connection with the other requirements of the specifications, has no other effect than that of an arbitrary decree that we shall be compelled to receive compensation for an assumed amount of work inevitably less than the actual amount which we are by the terms of our contract compelled to perform.

It will not do to assume that the Government required no larger section than the theoretical one required to exactly circumscribe the arch, or that the contractors must make any additional excavation at their own risk; because the Government, through the practice of its engineers, does actually require a larger section and we are just as much compelled to produce it in order to meet the other requirements of the lining as we are to produce the theoretical section in order to admit of the introduction of the arch at all.

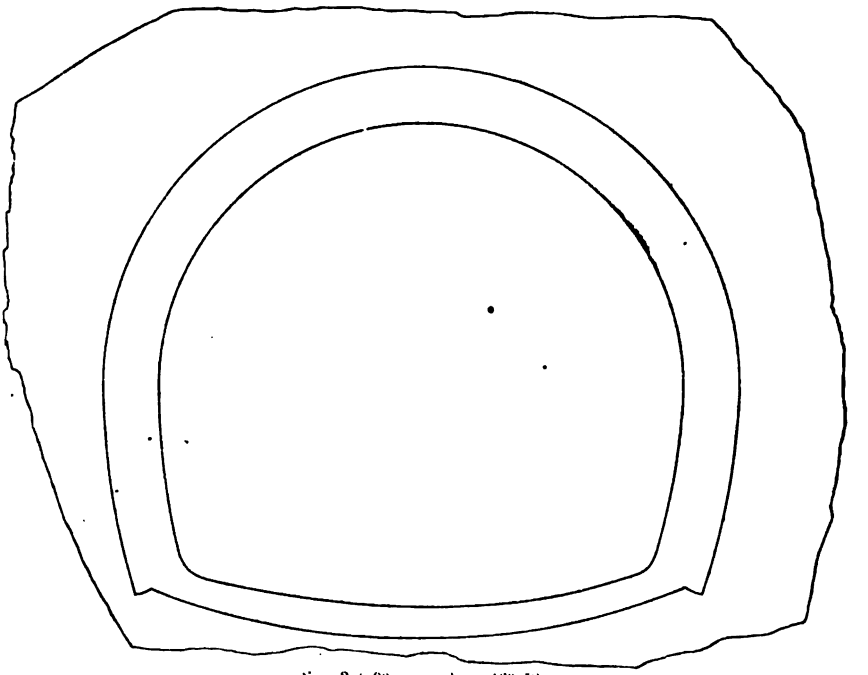
In order to demonstrate more clearly the difference between the hypothetical requirements of the assumed section and the actual requirements of the practical lining in place, we append a series of plotted actual cross-sections of the work as done, each having the outline of the theoretical section drawn with it.



Sec. 0 + 80. Area 152.64.



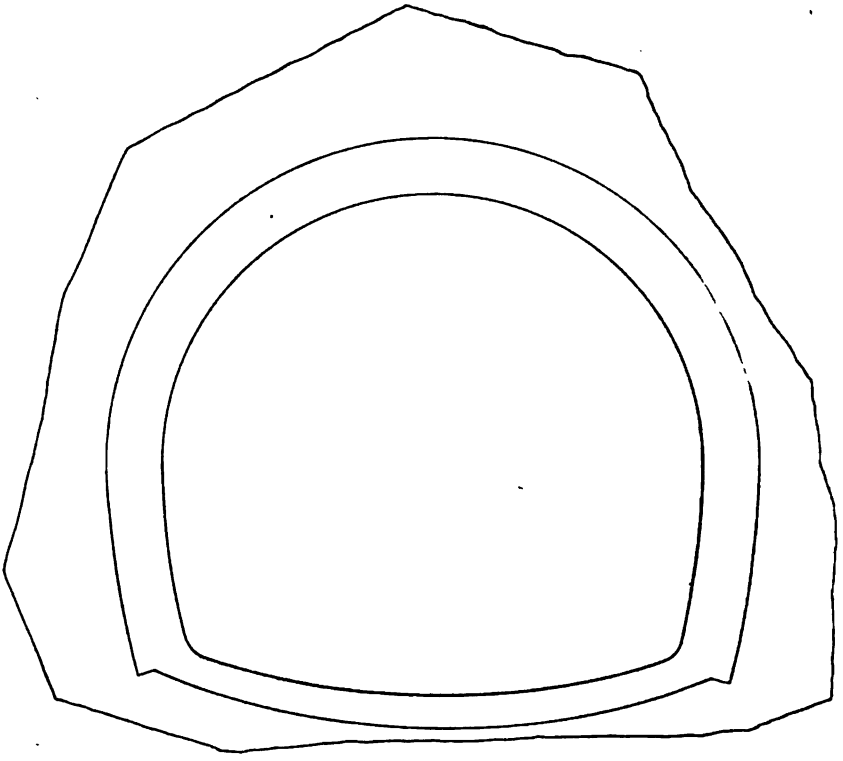
Sec. 1 + 28. Area 155.78.



Sec. 2 + 90. Area 160.52.

Our object in addressing this communication to you is to bring the subject to your attention and to ask you to name a time, as early as convenient, when you will confer with us upon the following points:

1st. Whether the theoretical section, as indicated by Captain Symons, is fair engineering practice in view of the palpable requirements of the contract and specifications regarding the masonry lining.



Sec. 2 + 42. Area 174. 08.

2nd. Whether you will not establish a standard section on a basis recognizing the actual requirements of the case, which standard section, while guaranteeing the utmost practicable economy to the Government, shall also guarantee to us a fair and just ratio between the compensation we are compelled to receive and the work we are compelled to do.

In case you do not deem a conference with us pertinent in the premises, we ask you to refer this communication to the Chief of Engineers, with an indorsement setting forth whether or not, in your opinion, the foregoing points are based upon good and just engineering practice.

So far as we can see, it is merely an administrative question, and can be determined by reference simply to current practice in similar cases.

Very truly, yours,

BECKWITH & QUACKENBUSH.

GEORGETOWN, D. C., *February* 17, 1887.

G. J. LYDECKER,
Major of Engineers, U. S. A., Washington, D. C.:

DEAR SIR: Supplementary to our communication of the 19th ult., we beg to call your attention to the accompanying official section of the New York tunnel, showing, 1st, the brick arch; 2nd, the various standard sections allowed in excavation; 3rd, the relation of each standard section to the character of ground for which it is determined.

Our object in calling your attention to this section is to verify the position which we maintained in our former communication, to the effect that in tunnels involving lining current engineering practice recognizes the necessity of a clearance between the exterior of the arch and the circumjacent walls of the standard section allowed in excavation, in view of the requirements of masonry packing for the security of the arch.

The accompanying official tracing shows: 1st, a minimum standard section involving 4 inches clearance all round the brick barrel; 2d, a maximum neat line of excavation, involving 8 inches clearance; 3d, a temporary timber section, involving clearance to the line of actual excavation; 4th, a permanent timber section, rectangular in form.

In estimate of payment the minimum or 4-inch clearance section is employed as a basis of computation in sound rock, free from fissures, in which it is assumed by the engineers the nearest approximate of the actual to the standard section is possible.

The maximum neat section having 8 inches clearance all round is employed for computation in ground showing fissures or other irregularities which tend to enlarge the disparity between the actual and standard sections beyond the control of the contractors, but not sufficiently infirm to require timbering.

The temporary timber section is that in which the engineers require removal of the timber supports preparatory to lining and packing. On this section the actual volume of rock removal is allowed in excavation.

The permanent timber section is that employed as a basis of computation in ground requiring the retention and bricking in of the timber supports, and the whole area circumscribed by the exterior line of the timber in place is allowed.

We think we are justified in referring to this great enterprise as a fair example of current engineering practice, as it is generally admitted to be the most extensive piece of tunnel work known to the history of the art.

We do not assume that the principles adopted in the New York tunnel should be applied here in their elaborate entirety.

We recognize that there are certain differences in the conditions under which the two works are being respectively prosecuted. There is a difficulty in the administration of the work here which does not obtain in regard to the New York work, and that is the fact that the contract under which the work here was let was predicated upon an assumed normal section, based in turn upon theories of Captain Hoxie as to the nature of the ground to be dealt with, which experience has shown to be largely fallacious, whereby adherence to the normal section was found impracticable.

Under the contract but two sections were distinctly contemplated; 1st, the normal section of 82½ square feet area, and, 2nd, the regular timber section of 167.30 square feet area.

The section ordered by Capt. Symons in his letter of May, 1885, was intermediate between the two and was the result of conditions not definitely provided for when the contract was made. In such an emergency it was to be expected that the section established as standard would be the smallest practicable in view of the requirements of the contract as a whole, so that the only question in the premises is as to the proper definition of the terms "smallest practicable" in engineering practice.

Capt. Symons evidently dismissed from consideration the requirements of the contract which relate to the proper securing of the arch, and considered only the introduction of the arch itself.

In our former communication we described the section thus determined by Capt. Symons as impracticable and not in accord with current practice.

And we respectfully suggest that the practice in the great work now going on in New York, the official determination of which is herewith submitted, fully sustain our position.

Very respectfully,

BECKWITH & QUACKENBUSH,
Contractors.

GEORGETOWN, D. C., *March 3d*, 1887.

G. J. LYDECKER, Esq.,
Major of Engineers, U. S. A., Washington, D. C.:

DEAR SIR: In our communications of January 19th and February 17th, relative to the standard lining section of the tunnel, we omitted to call your attention to certain points which we considered material and which we herewith respectfully submit for your consideration.

When Capt. Symons ordered that a section of 109$\frac{67}{100}$ sq. ft. area—that which would be exactly circumscribed by the exterior line of the brick arch—we objected to it on the ground that it was impracticable and did not involve proper recognition of the requirements of the contract as a whole,

Our objection was not entertained.

In fact the enlarged section was not then ordered to be taken out in ground, which, though plainly requiring lining, did not require timbering, but we were directed to proceed with the normal section of 82½ sq. ft.

Having completed the principal part of the excavation upon the normal section, we were then compelled to go over the whole ground again wherever lining was ordered, and trim from the roof, sides, and bottom sufficiently to admit the arch and its necessary backing.

When work was resumed under your administration in the remaining headings between Champlain avenue and Howard University, you directed the lining section to be taken out at first attack.

This method not only saves the trouble and expense of going over the ground a second time, but also enables us to make a neater and more uniform section than was possible under the former practice, whereby the work is made more economical both to the Government and to ourselves.

But unfortunately the bulk of the work had been done under the system pursued by Capt. Symons, and we are now going over that ground a second time at a great loss and inconvenience.

The language of the contract with reference to the cross section is as follows:

"The cross-section of the tunnel will be rectangular, eleven feet wide by seven and one-half feet high, except where lining is required, when the cross-section of excavation will be increased to such limits as the United States engineer shall indicate."

This language clearly implies, 1st, that it was the duty of the engineer to decide at once as to the requirement of lining wherever such ground was encountered, and, 2nd, that upon such decision it was his further duty to prescribe a section that would admit of lining with all its incidental requirements as stipulated, so that we could take it out at first attack, and thus avoid the necessity of re-excavating for enlargement. In support of this position we have only to appeal to your own practice since you have been in immediate charge.

It requires no argument beyond your own observation to convince you that the practice above noted, whereby we are compelled to go over the same ground twice, operated very greatly to our disadvantage, compelling us to be accountable for conditions beyond our control, and imposing upon us difficulties which a fair and just construction of the terms of the contract would have avoided from the start. The effects of this practice can not now be wholly remedied, but a partial rectification can be made by allowing a standard section in excavation based upon current engineering practice in similar cases, as requested in our previous communications.

Very respectfully,

BECKWITH & QUACKENBUSH,
Contractors.

GEORGETOWN, D. C., *May* 26, 1887.

Gen'l J. C. DUANE,
Chief of Engineers, U. S. A., Washington, D. C.:

SIR: Pursuant to our verbal communication made to you May 25, and in accordance with your permission, we herewith transmit copies of the papers pertaining to our application to Major G. J. Lydecker for a tunnel section in rock not requiring timbering (a section having been prescribed by Capt. Thomas W. Symons May 6th, 1885, which exactly circumscribes the brick masonry lining of the tunnel), which would be just to both parties to the contract, which would be in accordance with the custom in such cases, and the universal practice of engineers upon the tunnels built throughout the country, and be in accordance with the spirit and intent of the contract.

Major Lydecker in reply to our communication said verbally that the Government was paying us for all the excavation needed, and he would not take the responsibility of increasing the area of the section prescribed by Capt. Symons, and this, in brief, is the status of the matter at this writing.

We desire as briefly as possible to give you a history of the work from its commencement to the present time (so far as our connection with it is concerned). We began the work of sinking shafts on Dec. 12, 1883, and of driving tunnel Feb'y 15, 1884; the work of tunneling proceeded with the normal section 7½ x 11 ft. until bad ground was met with, and July 10th, 1884, instructions accompanied by diagrams providing for timbering the tunnel and lining it with concrete; on August 12th additional sections were furnished which provided for different forms of construction. On Nov. 5th, the plan of lining the tunnel with concrete was abandoned and it was ordered lined with brick, an outline section being furnished showing the plan of the brick-work, and on Nov. 10th, a plan of the brick masonry for lining tunnel was furnished us. Prior to this time we had been excavating a timber section for concrete

lining, when the nature of the ground made it necessary. At all other points the excavation was taken out to the normal section 7½ x 11 ft. as provided in the contract. On Dec. 17th, 1884, we were furnished with lines and grades and ordered from that date to run our lines and grades and be responsible for them; that after that time the Government engineers would simply check them to see if they were correct.

On Dec. 29th, 1884, we were notified that we were taking out tunnel larger than the contract required, the section required being 7½ x 11 ft. (this ground has since been lined with brick masonry.) On July 14th, 1885, points and grades were given us for lining in Champlain avenue with brick, and designating the stations, and on Mch. 4th tunnel lining with brick was commenced at Howard University, and on March 16th in the Champlain avenue west heading. On May 6th, 1885, Capt. Symons prescribed the section of excavation to exactly circumscribe the brick-work, and on Aug. 10th, 1885, he ordered that no brick-work be built except where absolutely necessary and the tunnel drift reduced to the normal section, and the work was continued under this order until Jan'y 30th, when it was suspended and an order issued to continue the pumping, the rate being fixed at $35.00 per day, the bare cost to us being over $48.00 per day. The work remained suspended until August 20th, 1886, when we again organized a force and cleaned out the fallen rock and began the work of driving the headings, and on August 30, 1886, the work of lining the tunnel was resumed; October 11, 1886, Howard University drift, and Nov. 4th, 1886, in Champlain avenue west, and the work of enlarging the tunnel from the normal section to section to admit of brick lining was commenced Nov. 1, 1886, and the whole work has continued without interruption until the present time. The monthly estimate for the month of November, 1886, showed so great a difference between the computations of our own engineer and the quantities paid for by the Government that we made inquiries of the tunnel engineer as to the cause, and were informed that we were estimated for all enlargement of tunnel from the normal section to lining section in accordance with the section prescribed May 6th, 1885. We then appealed to Major Lydecker and afterwards put the substance of our appeal in writing with the result as stated before, made May 24, 1887.

In the month of July, 1884, we were estimated and paid for rock removed outside the normal section at the rate of $1.50 per cubic yard, and although we showed that the price fixed by the engineer, which the contract says shall be a fair one, was not sufficient to cover the bare cost of loading and removing to the surface, no relief was accorded to us. We have, therefore, at this time this condition of affairs, and under it we are carrying on our work.

1st. We are required to run our lines and grades and are held responsible for them.

2nd. We are required to take out rock outside the section fixed for $1.50 per cubic yard.

3rd. A section has been prescribed which will exactly admit the introduction of the brick masonry.

4th. We are enlarging the tunnel where ordered after it has once been taken out to the normal section 7½ to 11 ft.

5th. We have protested and applied for relief thus far without success.

We are advised that the contract for this work is very plainly drawn and any ordinary construction of its provisions would not work an injustice to either party to it and that nothing in it contemplates an injustice to the contractor if justly and equitably carried out. Major Lydecker says that with questions of equity he has nothing to do, and therefore we appeal to you to do us exact justice. We ask for nothing but what we believe we are justly entitled to; the rulings made takes from us the profit which should reward our efforts, and we therefore respectfully ask that you will, as soon as possible, give the subject your consideration and decision.

Very respectfully,

BECKWITH & QUACKENBUSH.

P. S.—The diagrams of sections are in Major Lydecker's possession, as the papers explain them; we have not asked him for them believing you will understand them from the description, but should you require them we can procure them for you.

B. & Q.

NOTE.—The enclosures (not copied) to the above letter are letters addressed to Major Lydecker from Beckwith & Quackenbush as follows: (1) January 19, 1887, see No. 2030. (2) February 17, 1887, see No. 2066. (3) March 7, 1887, see No. 2083.

[1st indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
May 28, 1887.

Respectfully referred to Major G. J. Lydecker, Corps of Engineers, for report. To be returned.

By command of Brig. Gen. Duane.

JAS. C. POST,
Major of Engineers.

[2nd indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, July 13, 1887.

Respectfully returned to the Chief of Engineers, U. S. A., with report.

G. J. LYDECKER,
Major of Engineers, U. S. A.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., July 13, 1887.

The CHIEF OF ENGINEERS, U. S. A.,
Washington, D. C.:

SIR: I have the honor to submit the following report in relation to matters contained in a letter written to the Chief of Engineers, under date of May 26th, 1887, by Beckwith & Quackenbush, contractors for the tunnel extension of the Washington Aqueduct, and subsequently referred to me for report. Their letter is returned herewith.

For the purposes of this report it will be best to pass over, for the present, the history of the work as outlined in the contractors' letter, and deal at once with the matters in relation to which they appeal from my decisions. To this end, I will take up in their order and reply to each item of objection as summarized by the contractors (see their letter, page 5):

"1st. We are required to run our own lines and grades, and are held responsible for them."

It was found that the contractors' agents showed great carelessness in keeping to the lines and grades given them, and in preserving the marks established by our engineering force. It was, therefore, finally determined to set suitable pegs or marks in the several headings, and hold the contractors responsible for deviating from the lines and grades thereby indicated. This was not done until all the headings were well advanced—the shortest heading having been driven about 700 feet and the longest about 1,400 feet from the bottom of the working shafts from which they were started. I do not see that the contractors have any sufficient cause of complaint on this account, nor does it appear to be a matter of importance at this time, the tunnel having now been "holed" through.

"2nd. We are required to take out rock outside the section fixed for $1.50 per cubic yard."

This price was determined upon in the early part of the work, after careful consideration, under the following clause of the specifications: "In all cases the prescribed section must be preserved, and no payment will be made for material excavated outside the specified lines and grades; but all loose or insecure rock outside these lines, whether resulting from natural causes or from the prosecution of the work, that may be likely to fall into the tunnel must be removed. In cases where the necessity for such removal is not occasioned by the shattering of the rock by blasting, but is due to natural seams, cracks, or fissures, a fair price will be paid for removing the same; if the necessity results from the operation of blasting the removal must be at the expense of the contractor. All questions arising in this connection will be determined by the United States engineer, and the price to be paid for removal will be fixed by him and his decision shall be accepted by the contractor as final."

There appears to me no reason for changing, at this late date, the price for removal as fixed upon in the beginning, and which has been the basis of payment throughout.

"3rd. A section has been prescribed which will exactly admit the introduction of the brick masonry."

Reference is here made to the section for excavation in rock which requires lining but not timbering, being section No. 2 on the annexed sheet, which shows the several forms of sections finally adopted as the basis of operations in the varying character of rock that had been encountered. They were furnished to the contractors in the spring of 1885, and were published in the annual report for that year; they have appeared in all estimates laid before Congress for additional appropriations; they have also been the basis of all payments to the contractors, and it was not until the past winter that they presented to me any objection thereto. The specifications relative to tunnel cross-section provided as follows: "The cross-section of tunnel will be rectangular, eleven (11) feet wide by seven and one-half (7½) feet high, except where lining is required, when the cross-section of excavation will be increased to such limits as the U. S. engineer shall indicate." (Then follows the clause before quoted in this letter; see page 2.) Under this clause the lining section, as prescribed, was the outline of the brick-work, neither more or less, though the method of packing, out to the irregularities of excavation, which it was known would of necessity exist,

was likewise indicated; but the limit of excavation required and allowed was the outline of the brick-work, giving a cross-section of 109.67 feet, an increase of 27.17 feet over that for the unlined portions named in the contract. The clause of the specifications quoted above was purposely drawn to prohibit payments for excavation beyond the prescribed lines and grades, at the same time clearly contemplating the facts that the rock would break beyond these limits, and that such rock, except in certain specified contingencies, must be removed by the contractor at his own expense. It is claimed that the section referred to is not the controlling one, but that the change to lining section was in the nature of a modification of the specifications (which the U. S. engineer found it necessary to make); then the part of the specifications applicable thereto is as follows: "Written notice of any modification will, in each case, be furnished the contractor by the United States engineer, and no claim for extra allowance on account of such modification will be considered or allowed, unless presented in writing to the said engineer by the contractor within forty-eight hours after receipt of such notice." As before stated, the first presentation of any claim for additional compensation for excavating this lining section made to me by the contractors, was in their letter of January 19th, 1887, though Captain Symons, in his letter to them, dated May 6, 1885, distinctly states: "At points where lining is necessary, and the ground sufficiently firm not to require timbering, the outline of the *arch only* will be allowed, in accordance with previous decisions." Further supplemental articles of agreement were entered into with the contractors under date of October 18, 1886, having special reference to the work of lining, and though the specified limit of allowance in excavation had then been in operation for at least a year and a half, had been the basis of payments previously made to contractors, the basis of estimates printed in my annual report, and of the estimates on which Congress made the appropriation through which the supplemental articles of agreement were developed, still no suggestion of any increased allowance for excavation in the lining section was then made or contemplated. Under all these circumstances it was quite evident to me that I must deny the claim for such increased allowance when it was finally presented.

"4th. We are enlarging the tunnel, where ordered, after it has once been taken out, to the normal section of 7½ x 11 feet."

In reply to this it is enough to remark that they were fully aware that such must of necessity be the case when they undertook to do the work of lining contemplated by their supplemental contract.

There does not appear to be any good reason for extending this report by lengthy comments on the history of the work as recited by the contractors. The several cross-sections and instructions relating to lining (referred to on page 2 of the contractor's letter) were designed to meet local conditions as they had developed during the early period of the work when no considerable extent of lining was contemplated, but the contractors placed no lining in the manner indicated by these early sections and instructions; nor did they begin to place any lining until the middle of July, 1885, before which date the forms of section finally adopted had been furnished them, being with Captain Symons' letter of May 6, 1885; all work of lining has been in substantial conformity with those sections. The subsequent limitation of lining operations to the dangerous portions of the tunnel arose from the necessity of limiting expenditures, so that all the money then available would not be exhausted and the work brought to a stand-still before Congress had an opportunity to make an additional appropriation. The order of suspension of January 30th, 1886, was made when the money was reduced to about $1,500, and this small balance (supplemented by a subsequent special appropriation of $5,000) was applied to keeping the tunnel from becoming full of water until the next appropriation became available. The price paid for pumping is believed to have been adequate to meet the expense properly chargeable to that item only, but it is my understanding that the cost, at $48 per day, includes the wages of persons whose services were not necessary in that connection, but important to the contractors in other respects, such as the care of plant, reorganization for the resumption of work, &c.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

GEORGETOWN, D. C., *August 3rd*, 1887.

Major G. J. LYDECKER,
Corps of Engineers, U. S. A., Washington, D. C.:

DEAR SIR: We had yesterday a conference with General Duane, Chief of Engineers, U. S. A., in reference to your report upon our application for a revision of the section fixed by Capt. T. W. Symons of 109.67 sq. feet area.

The general said that we had complained that the section prescribed was impracticable and unjust, but had failed to state what dimensions of section we would con-

sider just and practicable; also that until a definite claim should be set up for such a section he could not consider the case.

We therefore state that we make no specific claim for extra work as such.

Our claim is that the section, as prescribed and as thus far allowed in excavation, is improper and unjust, and we claim that a section should be prescribed which will cover the excavation actually, necessarily, and unavoidably made, and required to be made, in order to produce the area necessary to put in and secure the work as per plans furnished by the U. S. engineers in charge.

This we do not consider to be a claim for extra work. It is simply a claim for the proper and just measurement of the excavation which we are required to make as provided by the contract and specifications.

Very respectfully,

BECKWITH AND QUACKENBUSH.

NOTE.—The enclosures mentioned in the foregoing letter are not copied, but can be referred to, as follows:

Exhibit A.—Letter of Beckwith & Quackenbush to Major G. J. Lydecker, dated January 19, 1887. (See L. R., 2030.)

Exhibit B.—Letter of Beckwith & Quackenbush to Major G. J. Lydecker, dated February 17, 1887. (See L. R., 2066.)

Exhibit C.—Letter of Beckwith & Quackenbush to Major G. J. Lydecker, dated March 7, 1887. (See L. R., 2083.)

Exhibit D.—Letter of Beckwith & Quackenbush to Chief of Engineers, dated May 26, 1887. (See L. R.. 2164.)

BECKWITH & QUACKENBUSH,
Georgetown, D. C., October 17, 1887.

General JAMES B. DUANE,
Chief of Engineers, U. S. A., War Department, Washington, D. C.:

DEAR SIR: We have repeatedly called the attention of the United States engineer in charge of the Washington Aqueduct tunnel, Major J. G. Lydecker, to the injustice which has been done us by the insufficient area of the standard lining section prescribed in the order of Capt. Thomas W. Symons, dated May 6th, 1885.

The language of Capt. Symons' order was as follows:

"At points where lining is necessary, and the ground sufficiently firm not to require timbering, the outline of the arch in excavation only will be allowed."

The clause of the contract under which this section was prescribed occurs on page 4 of the printed contract, under the head "Cross-section of tunnel," and is as follows:

The cross-section of tunnel "will be rectangular, eleven (11) feet wide by seven and one-half (7½) feet high, except where lining is required, when the cross-section of excavation will be increased to such limits as the United States engineer shall indicate."

In this connection we have only to say that, when we signed the contract containing the above clause, we assumed that the U. S. engineer, whenever called upon to act under its provisions, would be guided by the invariable engineering practice in such cases, which is to allow a clearance around the outline of the arch sufficient to cover approximately the excavation outside the neat line of the arch, which is indispensably required for the subsequent packing of the masonry, and Capt. Symons had no right to arbitrarily fix a section payment of excavation which was at once unfair, unjust, and impossible to procure.

When Capt. Symons' order began to take effect we appealed to Major Lydecker, under date of January 19th, 1887, a copy of which is annexed, marked "Exhibit A." On February 17th, 1887, we addressed to Major Lydecker a second communication, enclosing official sections of the New York tunnel as evidence of "current engineering practice," the said sections being now in the possession of that officer. A copy of this communication is annexed, marked "Exhibit B."

On March 7th, 1887, we addressed a third communication to Major Lydecker, which is annexed, and marked "Exhibit C."

No action being taken on these communications, we asked that the matter might be referred to you by Major Lydecker, with such indorsement as he might see fit to make, in order to bring it officially before the head of the Corps of Engineers. Major Lydecker thereupon sent up our application disapproved.

Subsequently we waited upon you personally at the headquarters of the Engineer Corps, and were verbally informed by you that you could take no further cognizance of our application until we should specify a section conforming in our judgment to current practice in such cases, stating therewith the increase of volume of excavation

which such section would give over that allowed by the U. S. engineer in his monthly estimate, and the approximate amount of compensation which we might consider due us thereby.

Subsequent to this interview we addressed a letter to you, giving a complete history of our connection with the tunnel enterprise, a copy of which is annexed, dated May 26th, 1887, and marked "Exhibit D."

Since that time we have collected evidence showing what has been the practice of engineers in allowing for excavation in lined tunnels driven by the cubic yard.

The practice has varied from an allowance of the entire actual excavation down to a clearance of six (6) inches all round the brick-work, which stands as the minimum of practice.

The section prescribed by Capt. Symons, exactly circumscribing the brick arch, has an area of 109.67 square feet, which gives 4.061 cubic yards of excavation to the lineal foot.

If we adopt the minimum of clearance allowed in current engineering practice, namely, six (6) inches all round the arch, including the invert, the area of the resulting cross-section would be 109.67 x 19.85 = 129.52 square feet, which gives 4.797 cubic yards of excavation to the lineal foot.

The result would be 0.736 cubic yards per lineal foot more than the estimates of the U. S. engineers, as rendered monthly on the basis of Capt. Symons' section, and the compensation, therefor, at the contract price, would be five dollars and eighty-nine cents ($5.89) per lineal foot.

The total for the whole work can not at this time be estimated, for the reason that no definite data exists as the ultimate lineal extent of the tunnel to be brought under the effect of this form of section.

We therefore limit our application to the lineal foot, leaving the total to be determined by the final result.

Our application is that the section to be allowed in excavation, for brick in ground requiring lining but not timbering, may be made to include a clearance of six (6) inches all round the arch, and to have an area of 129.52 square feet; the said section to apply to the entire portion of the tunnel so treated, and that section be substituted for the one prescribed by Capt. Symons in his letter of May 6th, 1885.

Very respectfully,

BECKWITH & QUACKENBUSH,
Contractors.

[First indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
Oct. 27, 1887.

Respectfully referred to Major G. J. Lydecker, Corps of Engineers, for information and remark. To be returned.

By command of Brig. Gen. Duane.

THOMAS TURTLE,
Captain of Engineers.

[Second indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, October 28, 1887.

Respectfully returned to the Chief of Engineers, with remark.

G. J. LYDECKER,
Major of Engineers, U. S. A.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, October 28, 1887.

The CHIEF OF ENGINEERS, U. S. A.,
Washington, D. C.:

SIR: I have the honor to submit the following remarks in relation to the communication of Messrs. Beckwith & Quackenbush, dated October 17, 1887, referred to me by endorsement of the 27th inst., though my report of July 13, 1887, in relation to this claim leaves but little opportunity for further remark.

The spirit of the specifications, which control on this work (and not current engineers' practice, or the practice on the New York aqueduct tunnel), is that the contractors shall be *paid* for excavation to certain lines—the normal rectangular section (7½ x 11) in one case, and the outline of the masonry arch, side-wall, and invert in the other; it is recognized that to reach these limits the excavation will extend beyond them, but the specifications do not contemplate payment for such exterior exca-

vation. This fact is not made apparent in the limited quotation from the specifications made herein. It must be quite evident that the extent of this outside excavation is largely dependent upon the care and skill of the contractors.

The contractors were advised of this ruling as early as November 5, 1884; the quotation herein from Capt. Symons' letter of May 6, 1885, is incomplete in omitting the final clause of the paragraph, viz, "in accordance with previous decisions."

The contractors state "when Capt. Symons order *began* to take effect we appealed to Major Lydecker, under date of January 19th, 1887, &c." In fact, the work of lining was in progress at the date of his order, and the amount of brick lining that had been actually put in place and paid for up to the end of January, 1887, was 3,525 cubic yards, or about one-third of the entire amount placed up to the present time, viz. 10,891 cubic yards. Therefore, the first appeal from Capt. Symons' ruling was not presented to me when "it *began* to take effect," but more than two years after he made it; in the mean time this ruling had been the basis of estimates submitted to Congress, published in annual reports and special communications familiar to the contractors, was in full force at the time they entered into their supplemental articles of agreement having special reference to lining, dated October 18, 1886, and they had without protest placed, and been paid for, lining aggregating in value about $65,000.

The length of tunnel lined to date is 8,767 feet; the claim of $5.89 pr. ft. for increased compensation presented by the contractors herein therefore amounts to $51,637.63. The appropriation being about exhausted, the work of lining under existing contracts has been discontinued.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

Hon. WM. C. ENDICOTT,
Secretary of War:

DEAR SIR: On October 29, 1883, we entered upon the construction of the Washington Aqueduct tunnel, under a contract between the United States and ourselves of that date. We prosecuted the work under the provisions of the contract to the satisfaction of the United States engineer in charge until January 30, 1886, when that officer ordered us to suspend in consequence of the exhaustion of the original appropriation. On August 30, 1886, we resumed work under the original contract, pursuant to the recommendation of the Engineer Board and in accordance with the provisions of the general deficiency act for 1886. On October 1st, 1887, work was again ordered suspended by reason of exhaustion of the second appropriation.

At the date last named the tunnel was in condition as follows:

Rock excavation, or normal section, complete.

Enlargement of normal section to admit masonry lining completed for about nine thousand (9,000) linear feet.

Masonry lining completed for about eight thousand (8,000) linear feet.

Work remaining to be done:

Further enlargement for lining not determined, but probably the entire remaining extent of the tunnel.

Further masonry lining same as above.

Influent and effluent shafts to be lined, and intermediate working shafts to be closed and secured.

In our judgment, if sufficient funds were available, so that uninterrupted progress might be made, the tunnel could be completed by us in about eight (8) months.

Since the last order of suspension the United States engineer in charge, Major G. J. Lydecker, has indicated an inclination to terminate the contract dated October 29, 1883. This would involve the removal of our plant, cleaning out the tunnel in an unfinished condition, and therefore considerable delay in the resumption of work under any other auspices. We do not propose here to discuss the question of our legal right to complete the work under the original contract. Our present object is to show that such a policy would inure to the best interests of the Government as well as ourselves.

First. Because we can complete it more promptly than it could be done by a new contractor or by the Government itself.

Second. Because in the present state of the labor and material market no new régime could come in and prosecute the remainder of the work as economically as we can do, operating as we are upon the basis of contracts for supplies, &c., made when prices were lower than they are now.

Third. Because the completion of the work under other auspices would involve the introduction of a new plant, the cost of which alone would be far in excess of any reasonable profit on the amount of work remaining to be done.

In this connection it may be proper to remark that, but for the exhaustion of the appropriation, for which we were in no way responsible, the question of terminating the contract would not have been raised.

On our own part, we naturally desire to complete the work, of which we have done so large a portion, for the sake of our reputation as contractors, which is not only a matter of pride with us but also a thing of commercial value.

In view of all these considerations, we respectfully suggest that when Congress shall provide means for again resuming operations the same course be pursued as was done last year.

Our desire throughout has been to complete the work to the satisfaction of the Government, and to reach a final settlement, under the terms of the contract, without litigation. When the contract has been construed by the United States engineer in charge in such manner as to work injustice to us, we have appealed first to him for rectification, and from him to the Chief of Engineers, but in all cases without result. We therefore appeal finally to you.

It seems that the officers in charge of this work under your authority proceed upon the theory that the United States is not amenable to the obligations of contracts in the same sense as an individual or corporation would be.

We append papers, consisting of communications to General James B. Duane and Major Lydecker, in regard to the section prescribed for the measurement of rock excavation. We hold that this section is contrary to current engineering practice, and that the effect of it is to deny us compensation to which we are justly entitled by a fair construction of the contract.

NOTE.—For enclosures to this letter, see as follows:

1. Letter dated January 19, 1887, from Beckwith and Quackenbush to Major G. J. Lydecker (L. R. 2030).
2. Letter dated February 17, 1887, from Beckwith and Quackenbush to Major G. J. Lydecker (L. R. 2066).
3. Letter dated March 7, 1887, from Beckwith and Quackenbush to Major G. J. Lydecker (L. R. 2083).
4. Letter dated May 26, 1887, from Beckwith and Quackenbush to Chief of Engineers (L. R. 2164).
5. Letter dated October 17, 1887, from Beckwith and Quackenbush to Chief of Engineers (L. R. 3011).

These papers explain themselves. We respectfully request that you will direct an investigation of their subject-matter in such manner as will give us an opportunity to be heard and to produce evidence to demonstrate the correctness of our position and the justness of claims.

Very respectfully,

BECKWITH & QUACKENBUSH.

WASHINGTON, *Nov.* 28, 1887.

[First indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
Nov. 30, 1887.

Respectfully referred to Major G. J. Lydecker, Corps of Engineers, for report.
By command of the Acting Chief of Engineers.

THOMAS TURTLE,
Captain of Engineers.

[Second indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, December 8, 1887.

Respectfully returned to the Chief of Engineers, U. S. A.

The chief feature of this communication appears to be the appeal to the Secretary of War in relation to the question of increasing the area heretofore adopted as the basis of payment for excavation of lining section in tunnel. The ground of the contractors' claim is that our allowance "is contrary to current engineering practice;" we reply that such practice is not the controlling consideration, and that under the conditions of the contract, and all attendant circumstances, their claim can not be allowed. The question is considered at length in my reports of July 13 and October 28, 1887, copies of which are herewith. If this claim is a good one, it is a most powerful reason why the work ought not to be continued and completed under any existing contract, even if such course should be authorized by law. Therefore I am not prepared to recommend that Congress take action looking to the completion of the work under these contracts, as suggested in this communication. Simply to correct a mistake herein (page 1) I would call attention to the fact that no recommendation whatever was made by the Engineer Board in relation to resuming work in 1886 under the original contract.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 158.]

E E.—*Indorsements on report of Board of Engineers on modification of plan for new reservoir.*

[1st indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
July 27, 1885.

Respectfully submitted to the Secretary of War.

The project now in process of execution under the provisions of the act of July 15, 1882, for increasing the water supply of Washington, D. C., provides for a new reservoir near Howard University, and in constructing this work it has been thought advisable to make certain changes in the details of plan so far as regards the pipes designed to carry off the ordinary flow, sewage, etc., of the small streams entering the site of the reservoir near its northeasterly and northwesterly limits. The approved plan provides for iron pipes to be laid in the bottom of the reservoir to be thoroughly caulked and imbedded in concrete; the *storm waters* to be taken off in open channels except where the depth of excavation necessitates the construction of closed conduits. The modification proposed by Major G. J. Lydecker, Corps of Engineers, the officer in charge of the work, is to *omit* the iron pipe drains, and to substitute therefor closed conduits around the reservoir for the open flood channels as shown on the sketch accompanying his communication.

It was deemed advisable that this proposed modification of the adopted plan be referred to a board of engineer officers for examination and report. It was, with the sanction of the War Department, so referred, and the report of the board, also submitted herewith, as will appear, indorses the modification of plan proposed by Major Lydecker, and remarks: "With reference to the probable security of the storage and purity of supply in the reservoir, the board sees no valid reason for mistrust or want of confidence in the plans and methods that are, or are to be, followed by the officer in charge of the work." * * * "It is the opinion of the board that the modifications herein recommended and methods of construction outlined as above, all as proposed by the officer in charge of the work, will properly secure the storage and purity of supply in this reservoir."

It will be observed that the adoption of the proposed modification of plan will involve an additional cost of $37,763 over the original estimate, and that an additional appropriation of $110,000 will be required according to the *existing* project, or of $150,000 if the modification of plan be adopted. The views of the board of engineers are concurred in, and the modified project is recommended for approval. In view of the fact, however, that the existing project was approved by Congress, it is suggested that the modified plan be also submitted to that body for its action.

JOHN NEWTON,
Chief of Engineers, Brig. and Brt. Maj. Gen.

[2d indorsement.]

Respectfully returned to the Chief of Engineers to be submitted during the next session of Congress.

By order of the Secretary of War.

JOHN TWEEDALE,
Chief Clerk.

WAR DEP'T, *July* 29, '85.

[Committee No. 159.]

Y Y.—*Report of Major Lydecker, relative to claim of Chittenden Brothers, for cement furnished, etc.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., November 12, 1887.

The CHIEF OF ENGINEERS, U. S. A.,
Washington, D. C.:

SIR: I have the honor to submit the following report in relation to the claim submitted in the brief of R. H. Thayer, attorney for Chittenden Brothers, for compensation, as an extra, for Portland and Rosendale cements furnished under their contract for the dam at the Great Falls of the Potomac.

At the outset I would invite attention to my former report on this same claim, made under date of March 21st, 1887, a copy of which is among the papers herewith.

Since receiving the brief now under consideration, I have diligently re-examined the office records bearing thereon and find but little to add to my former report, or reason to modify my conclusion. The facts as I understand them, and as they appear from the record, are:

1st. That some time after the masonry work on the dam was commenced in the spring of 1884, the contractors commenced to bring on the work cement which was not equal to that at first supplied, and which did not come up to the requirements of the work or to the spirit and meaning of the specifications; the record of tests indicate further that their cement was decidedly inferior to cement of the same brand in use on other parts of the work.

2nd. Pending examination of this cement, with a view to preventing interruption of operations during the favorable working season, the contractors were *authorized*, as a temporary expedient, to attempt to make satisfactory use of this cement by the addition of Portland cement, and afterwards by increasing the proportions of cement used in making mortar; the purpose being by these means to obtain if possible a mortar of satisfactory strength. For all the Portland cement so used, and for all mortars in which the extra dose of cement was used, extra compensation was made to the contractors.

3rd. When it appeared to be established that the Round Top cement furnished by these contractors was absolutely unfit for its purpose and inferior to samples of that brand supplied in this market and used on other parts of the work, its further use on the dam was prohibited (October 6, 1884) and the contractors were informed that Rosendale cement "*would be* accepted, always subject to inspection and test, *but no extra price can be paid therefor.*"

Thereupon the contractors wrote protesting that they should be paid extra if they supplied Rosendale cement. The question being submitted to me I informed the contractors that I would examine into the matter, and that they would be entitled to increased compensation if it should appear that the poor results obtained with the cements supplied by them were due to inherent defects in the Cumberland cements and to no fault of theirs.

On examination I came to the conclusion that the results were not due to inherent defects of the Cumberland cements, but that this market furnished such cements of a quality equal to the requirements of the work; it was also represented to me that better results would have been obtained had the cement been delivered in barrels instead of bags, especially when the damp condition of the locality of the work is considered. In relation to this point I would note that the contractors in their affidavit of June 27th, 1887 (par. 9, p. 3), suggest it as a reason why allowance should be made in judging of the cement supplied; it is rather a strong reason why they should have taken every possible care as to its delivery and preservation.

With my understanding of the facts as outlined above, I could not conclude that I would be justified in allowing the claim for extra compensation on account of the use of Rosendale cement.

Mr. Thayer's brief (p. 6) refers to expressions used in letters quoted as indicating that the engineer officers had, in fact, "induced the contractors to supply a higher priced cement upon the express promise of allowing the difference in price," etc. I submit that the record shows no such promise. It is true that the use of the expression "further allowance," in Captain Symon's letter, suggests the idea that it had been determined to allow extra for Rosendale cement used prior to that time; but no such conclusion had been arrived at, and I take it that his purpose was simply to emphasize the position that no allowance would be made for Rosendale after that date, regardless of what might be the final disposition of their claim for that already used.

Referring to the discussion in relation to tensile strength of the cement as contemplated by the specifications, I desire to state that I have always acted as though they read 57 pounds per square inch instead of 75, the transposition of figures not having been detected until after the contract was made. The standard adopted (57 pounds) was based on a report made to me by Prof. De Smedt, that such was the average tensile strength of the Round Top cement for the fiscal year just ended when the specifications were drawn up; these figures will be found in his annual report for 1883. Of the Round Top cement condemned at the dam, samples tested by Prof. De Smedt in August and September, 1884, showed an average tensile strength of from 40 to 42 pounds only. I have never dealt with this question in any other spirit than that the cement furnished should show, substantially, an average tensile strength of 57 pounds per square inch, under the prescribed conditions.

In this connection I would invite attention to par. 10 of the contractor's affidavit of June 27, 1887, reciting that I would admit their compliance with contract obligations if the tests showed a tensile strength within ten pounds of the average. I can not imagine whence he derived that idea, for I certainly never gave any such assurance, nor ever thought of so doing.

As to the statement in Mr. Thayer's brief, that the Round Top Cement condemned at the dam was immediately hauled to the new reservoir and used on that work, I

can only say that it might have served the contractors some good purpose had they made such representations at the time; the statement can not be accepted at this late date until proven.

I certainly know nothing about it further than that the tests of Round Top cement used on the reservoir, and the results obtained from its use, were in all respects satisfactory.

The claim for the 59 barrels of Portland cement is based on the assertion that it became valueless through deterioration by reason of having been kept on the work, and proved a total loss to the contractors.

This is the first time the claim has been presented in that shape; it does not seem that it should have become valueless if properly housed. In any event, the cement was removed from the work by the contractors, as I am informed, at the close of operations, but I have no knowledge as to the final disposition made of it.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 160.]

YY.—*Letter of the Secretary of War to R. H. Thayer, attorney, in regard to claim of Chittenden Brothers.*

WAR DEPARTMENT,
Washington City, November 21, 1887.

SIR: Referring to our recent interview in regard to the claim of Chittenden Brothers for compensation for cement supplied under their contract for the dam at the Great Falls of the Potomac, I beg to state that if you will call at the Department you can now see Major Lydecker's report in regard to the claim in question.

Very respectfully, your obedient servant,

WILLIAM C. ENDICOTT,
Secretary of War.

R. H. THAYER, Esq.,
Of Thayer and Coldren, Att'ys, 47 Corcoran Building,
Washington, D. C.

[Committee No. 161.]

ZZ.—*Transmittal for approval of supplemental contract with Beckwith & Quackenbush for tunnel.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., December 8, 1887.

The CHIEF OF ENGINEERS, U. S. A.,
Washington, D. C.:

SIR: I have the honor to transmit herewith supplemental articles of agreement, which are designed to fix the status of the parties in interest on the tunnel for the Washington Aqueduct extension, pending the period of suspension that must last until further appropriation is made for continuing the work.

As I understand the matter, all existing contracts relating to this work must end with the expenditure of appropriations heretofore made for its prosecution. There is still a small balance in hand, but not enough to warrant further active operations at this time; in the mean time it is desirable, in the interests of the Government, that the plant on the work should not now be removed, in order that the tunnel may at any time be emptied for inspection or other purposes, and it is likewise probable that it may be used to advantage when work is resumed, whether by the present or other contractors. But as the work already done by the contractors has been paid for to the extent of only 90 per cent. of its estimated value at contract prices, and as the work to be done is believed not to be covered by the existing contracts, it appears to be neither equitable nor necessary under these contracts to longer withhold the 10 per cent. retained as a guarantee for the work actually done under them. Therefore, it is stipulated that 85 per cent. of this retain should now be paid to the contractors.

The balance of the articles are simply intended to provide for such pumping as may be found necessary under the directions of this office until active work is resumed, predicated on the idea that the Government shall assume the actual cost of pumping, in addition to keeping one competent man in charge o the two most important pumps during the inactive period.

Continuous pumping is not deemed necessary during this period of suspension, differing in that respect from the conditions existing during the previous period of suspension in 1886.

These articles are respectfully submitted for consideration and approval, it being understood by the signing parties that they are to become operative only when approved as specified therein.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[1st indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
Dec. 16, 1887.

Respectfully submitted to the Secretary of War.

It is desirable to provide for the pumping of the tunnel during the suspension of active operations. Since it is not to the advantage of the Government to have the work finished, the plant removed, and the contract closed at the present time, the payment to the contractors of 85 per cent. of the amount retained from past payments is, under the circumstances, considered equitable. The balance still retained will be amply sufficient to secure the Government for the finishing work necessary to close the contract. The supplementary articles of agreement, being considered mutually advantageous to both parties, have been approved by the Acting Chief of Engineers and their approval by the Secretary of War is recommended.

CHAS. W. RAYMOND,
Acting Chief of Engineers.

[2nd indorsement.]

WAR DEPARTMENT,
December 19, 1887.

Respectfully returned to the Acting Chief of Engineers with supplemental contract approved this date.

By order of the Acting Secretary of War.

JOHN TWEEDALE,
Chief Clerk.

[3rd indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
Dec. 21, 1887.

Respectfully transmitted to Major G. J. Lydecker, Corps of Engineers, with three copies of supplementary articles.

This paper to be returned.

By command of Brig. Gen. Duane.

THOS. TURTLE,
Captain of Engineers.

[4th indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, December 22, 1887.

Respectfully returned to the Chief of Engineers, U. S. Army.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 162.]

Indorsement on application of Beckwith & Quackenbush for extension of contract, etc.

[Third indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
Dec. 12, 1887.

Respectfully returned to the Secretary of War. Messrs. Beckwith and Quackenbush desire to secure two objects from the consideration of this letter:

1st. To have their present contract and the supplementary articles of agreement extended over future appropriations to the completion of the tunnel; and

2d. To obtain payment for a section of excavation "to include a clearance of six inches all round the arch."

With reference to the first point, Messrs. Beckwith and Quackenbush remark that they "do not propose here to discuss the question of their legal right to complete

the work under the original contract." This office *can not* discuss it: to do so would be to admit that the contract could have been made to create an obligation in excess of appropriations already provided, which is contrary to law.

As to the extension of the contract and the supplementary articles over future appropriations, the power to do so is not known to this office, unless such extension be provided for in the acts making the appropriations. The policy of doing so is questionable, and is not recommended in the present case.

In regard to the requested allowance for increased section of excavation, it is noted that the specifications (page 4) relative to *cross-section of tunnel* establish that where lining is required "the cross-section of excavation will be increased to such limits as the United States engineer shall indicate." The limits were prescribed according to, and this office can not recommend that allowance be granted as requested, especially when the limits were not objected to until so long after the fact.

CHAS. W. RAYMOND,
Acting Chief of Engineers.

[Committee No. 163.]

A[b].—*Indorsements on letter of February* 1, 1888, *House Committee on Appropriations, relative to H. R.* 6437.

[1st indorsement.]

WAR DEPARTMENT,
February 8, 1888.

Respectfully referred to the Chief of Engineers to call on Maj. Lydecker for his views in regard to the provisions contained in lines 23–25, inclusive, p. 7, and lines 1–4, inclusive, p. 8.

By order of the Secretary of War.

JOHN TWEEDALE,
Chief Clerk.

[2d indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
Feb'y 11, 1888.

Respectfully referred to Major G. J. Lydecker, Corps of Engineers, for report called for by the preceding indorsement.

By command of Brig. Gen. Duane.

JAS. C. POST,
Major of Engineers.

[3d indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, Feb. 15, 1888.

Respectfully returned to the Chief of Engineers, U. S. Army, with report as directed in the foregoing indorsement.

G. J. LYDECKER,
Major of Engineers.

[4th indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
Feb. 20, 1888.

Respectfully returned to the Secretary of War, with report of Major G. J. Lydecker, Corps of Engineers, dated the 15th instant, called for by the 1st indorsement.

J. C. DUANE,
Brig. Gen., Chief of Engineers.

[Committee No. 164.]

A[c].—*Major Lydecker's report on provisions of H. R.* 6437.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., February 15, 1888.

The CHIEF OF ENGINEERS, U. S. ARMY,
Washington, D. C.:

SIR: I have the honor to submit the following in relation to the provisions contained in lines 23–25, inclusive, p. 7, and lines 1–4, inclusive, p. 8., H. R. bill 6437, first session 50th Congress, as directed by indorsement of Chief of Engineers, U. S. Army, on copy of said bill, under date of the 11th inst.

The matter relates to the pending appropriation for completing the Washington Aqueduct tunnel, and the lines referred to read as follows: "The work above provided for to be done under the contract heretofore made or by a reletting, as in the discretion of the Secretary of War shall be most promotive of the interests of the Government: *Provided*, That no contract shall be made at prices greater than the prices allowed under contract under which work has been heretofore done on said tunnel."

It is my opinion that it will "be most promotive of the interests of the Government" to complete the work under the contracts heretofore made, IF the contractors will enter into supplemental articles of agreement covering the spirit of the proviso above quoted. The discussion, to which I was a party, in the Committee on Appropriations when the subject in question was under consideration, enables me to infer that the proviso is intended to prevent, in any future contract, any allowance for work to be done other than such as has heretofore been made; it has special reference to a claim which the contractors have pressed upon the department, for payment for excavation beyond the designated limits of the masonry arch, side-walls, and invert of the tunnel lining, as last presented, in their letter of October 17th, 1887. This claim is for an allowance, at contract price for excavation, for a clearance of six inches outside of the designated lining limits; for the work of lining already done the amount of the claim is, in round numbers, $50,000. It is based on what purports to be "current engineering practice." As against this the claim is disallowed for reasons stated in my report to the Chief of Engineers dated October 28, 1887, as follows: "The spirit of the specifications which control on this work (and not current engineers' practice, or the practice on the New York Aqueduct tunnel) is, that the contractors shall be *paid* for excavation to certain lines—the normal rectangular section (7½ x 11) in one case, and the outline of the masonry arch, side-wall, and invert in the other; it is recognized that to reach these limits the excavation will extend beyond them, but the specifications do not contemplate payment for such exterior excavation; this fact is not made apparent in the limited quotation from the specifications made herein. It must be quite evident that the extent of this outside excavation is largely dependent upon the care and skill of the contractors.

"The contractors were advised of this ruling as early as November 5, 1884. The quotation herein from Capt. Symons' letter of May 6, 1885, is incomplete in omitting the final clause of the paragraph, viz, 'in accordance with previous decisions.'

"The contractors state, 'When Capt. Symons' order *began* to take effect we appealed to Major Lydecker under date of January 19, 1887,' etc. In fact, the work of lining was in progress at the date of this order, and the amount of brick lining that had been actually put in place and paid for up to the end of January, 1887, was 3,525 cubic yards, or about one-third of the entire amount placed up to the present time, viz, 10,891 cubic yards. Therefore, the first appeal from Capt. Symons' ruling was not presented to me when 'it *began* to take effect,' but more than two years after he made it. In the meantime this ruling had been the basis of estimates submitted to Congress, published in annual reports and special communications familiar to the contractors, was in full force at the time they entered into their supplemental articles of agreement, having special reference to lining, dated October 18, 1886, and they had without protest placed and been paid for lining aggregating in value $65,000."

If this claim is good under existing contracts, and can be recovered through the courts, it would reach to about $100,000, if the work is completed under these contracts. As I now understand the matter, I incline to the opinion that it might be "most promotive of the interests of the Government" to advertise for proposals to complete the work, unless the present contractors conclude to formally waive the claim in question.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 165.]

A[d].—*Maj. Lydecker recommends completion of tunnel under present contract upon certain conditions.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., April 14, 1888.

The CHIEF OF ENGINEERS, U. S. ARMY,
Washington, D. C.:

SIR: The urgent deficiency act approved March 30, 1888, appropriates three hundred and fifty-five thousand dollars ($355,000.00) for completing the tunnel extension of the Washington Aqueduct. The act also provides:

1st. That all the work shall *be completed by November 1st*, 1888.

2d. That it may be done "under the contract heretofore made or by a reletting as

in the discretion of the Secretary of War shall be most promotive of the interest of the Government."

3d. That "no contract shall be made at prices greater than the prices allowed under contract under which work has been heretofore done" on the tunnel.

I am satisfied that it will be utterly impossible to comply with the first condition above named, for reasons already stated in my letter of March 29th, 1888. The nearest approach to compliance will, of course, be had by continuing operations under the present contract; also in every other respect, save one, it would be in my opinion "most promotive of the interest of the Government" to complete the work under this contract. The only objection against such course is in the claim for an allowance for excavation beyond the designated limits of lining section, which the contractors have urged since January 19th, 1887, but which I have always refused to entertain on the ground that the contract did not authorize it. This claim, as last presented in their letter of October 17, 1887, amounts to about $51,000; if it is good under the present contract for the work already done, it will grow to over $100,000 should the work be completed under that contract. I feel satisfied that the claim is not a good one, and such also was the opinion expressed to me by members of the Committee on Appropriations, by whom it was carefully investigated (with copies of the contract and other papers relating thereto before them) when the bill was being prepared; it was then admitted that the courts alone were qualified to finally determine the contractors' legal rights as they existed up to that time, but the determination was expressed to so legislate that no future contract should afford ground for any such claim. The proviso (3d) before quoted, in relation to prices, was, as I understand, intended to accomplish that purpose.

The conclusion and recommendation to which all this leads me is that the work be completed under existing contracts, provided the contractors distinctly and formally waive the claim above considered, and agree to carry the work to completion in accordance with the decision heretofore made by the United States engineer in charge, in relation thereto; this understanding to be incorporated in supplemental articles of agreement, which will include all other necessary provisions for completing the work. In view of the limitation as to the time of completion, it would likewise be well to provide that payment for work done after November 1, 1888, be subject to legislation by Congress, whereby the time limit shall be extended, or authority expressly given to pay for work done after the limit.

I would add that as soon as I learned of the passage of the urgent deficiency bill by both houses of Congress, I caused the contractors to put all their pumping machinery now on the work into active operation, in order to get the tunnel cleared of water, and have all in readiness for a resumption of work at the earliest date possible. Pumping was commenced on the afternoon of March 26th, and has continued night and day since that time. It is probable that everything will be in readiness to resume work of excavation and lining, in the headings from Foundry Branch working shaft by the 21st instant.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

NOTE.—The pumping operations above referred to were provided for in supplemental articles of agreement entered into when active work was suspended last fall

[1st indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY.
April 17, 1888.

Respectfully submitted to the Secretary of War with concurrence in the views of Major Lydecker as within given, and with recommendations that they be approved.

J. C. DUANE,
Brig. Gen., Chief of Engineers.

WAR DEPARTMENT,
Apr. 18, 1888.

Approved.

WM. C. ENDICOTT,
Sec. of War.

[3d indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
April 18, 1888.

Respectfully returned to Major G. J. Lydecker, Corps of Engineers, inviting attention to the 1st and 2d indorsements, by which he will be guided.

After such record as may be necessary has been made, this paper will be returned to this office.

By command of Brig. Gen. Duane.

JAS. C. POST,
Major of Engineers.

[4th indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, May 8, 1888.

Respectfully returned to the Chief of Engineers, U. S. Army, together with supplemental articles of agreement (in quintuplicate) designed to cover the requirements of the act of appropriation, but from which is omitted one element of my original recommendation, viz, that the contractors waive their claim for excavation beyond the designated lining limits, *in the work heretofore completed.* This element of controversy is not incorporated in the articles now submitted, as having no material bearing on the work remaining to be done, and they simply look to completing the work of lining within the designated limits of time, and for the amount appropriated. The cost of this work as estimated under the articles transmitted is:

364 l. ft. at	$40.00	$14,560.00
11,365 l. ft. at	24.50	278,442.50
200 l. ft. at	28.50	5,700.00
Total		298,702.50

To meet this we have about $315,000, including the available balance of the old appropriation.

It is proper to add that the conclusion to disregard outstanding claims, in relation to work already completed, was arrived at after several interviews with the Secretary of War. The articles are now submitted for final action.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Fifth indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
May 9, 1888.

Respectfully submitted to the Secretary of War, recommended for approval.

J. C. DUANE,
Brig. Gen., Chief of Engineers.

[6th indorsement.]

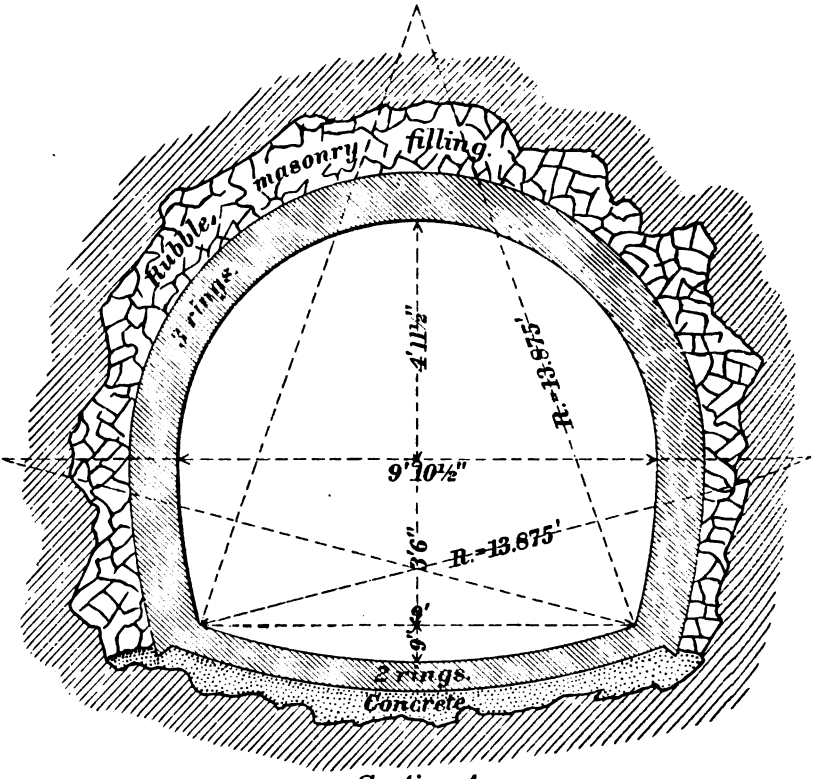
WAR DEPARTMENT,
May 10, 1888.

Respectfully returned to the Chief of Engineers with supplementary articles of agreement in quintuplicate, approved by the Secretary of War this date.

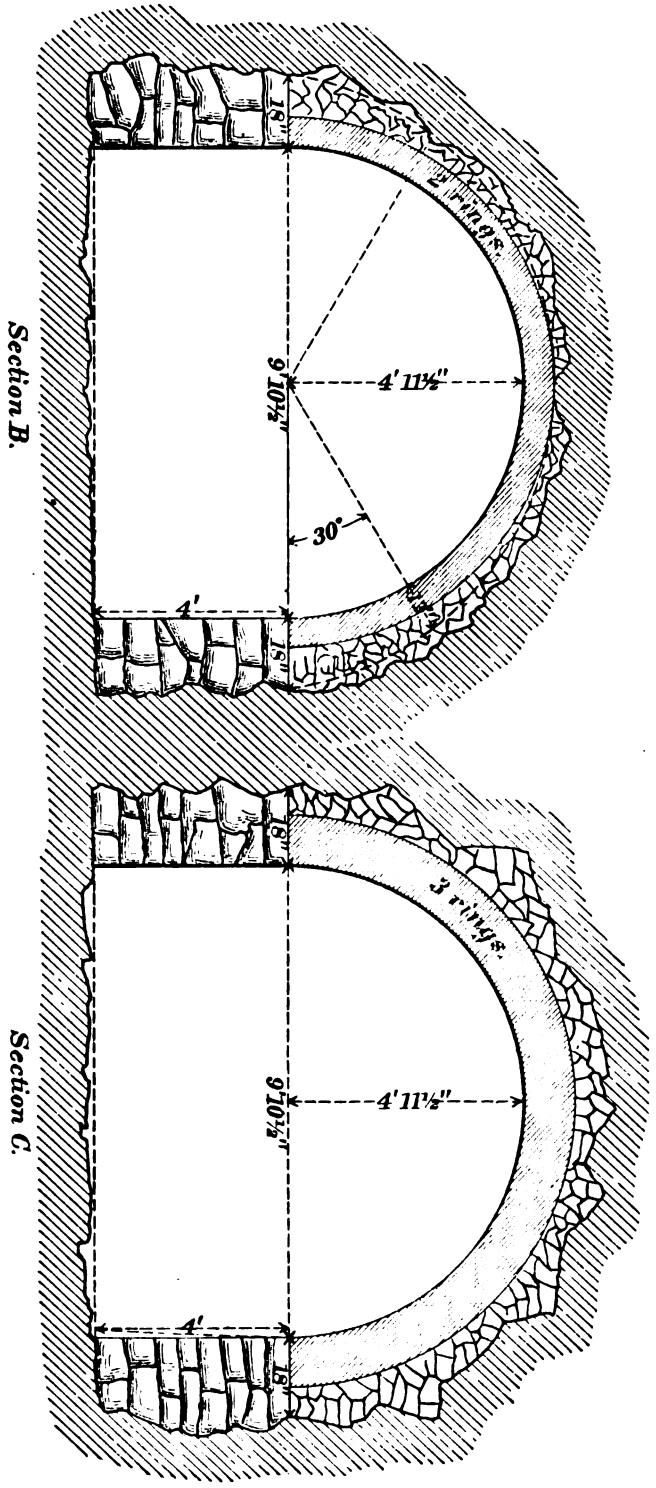
By order of the Secretary of War.

SAM'L HODGKINS,
Acting Chief Clerk.

[Committee No. 166.]



Section A.


Section B.
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3 rings.
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Section C.
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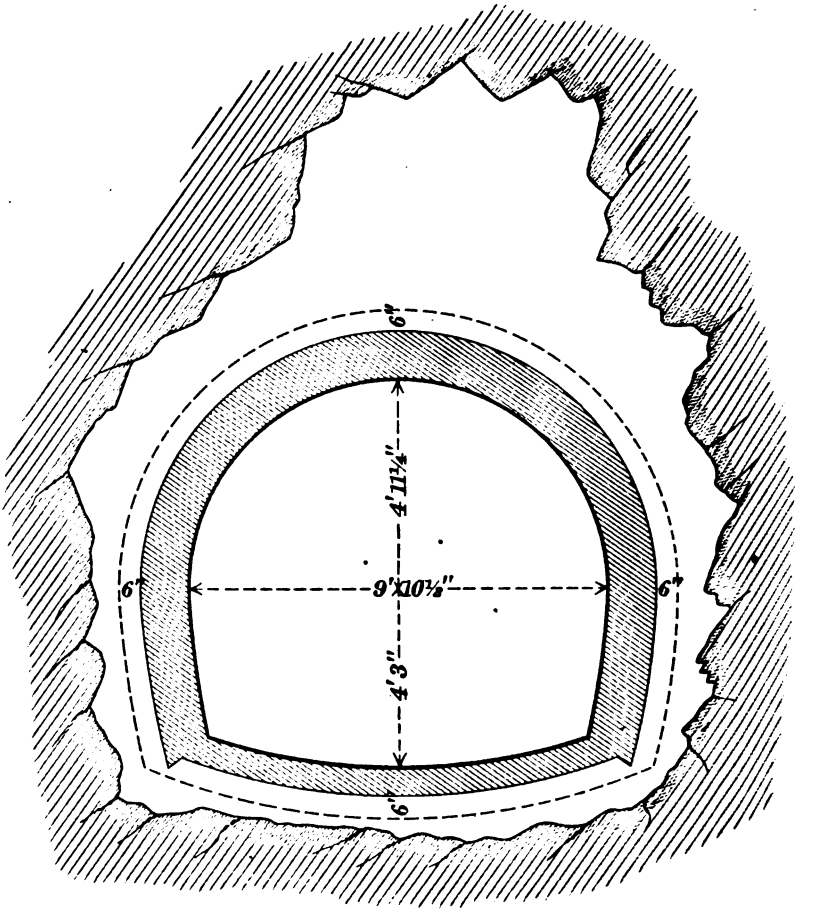
[Committee No. 167.]



[Committee, No. 168.]

A[d3].—*Letter of Major Lydecker relative to claim of Beckwith & Quackenbush for pay for excavation beyond limits of masonry.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, October 28, 1887.

The CHIEF OF ENGINEERS, U. S. A.,
Washington, D. C.:

SIR: I have the honor to submit the following remarks in relation to the communication of Messrs. Beckwith and Quackenbush, dated October 17, 1887, referred to me by indorsement of the 27th inst.; though my report of July 13, 1887, in relation to this claim leaves but little opportunity for further remark.

The spirit of the specifications which control on this work (and not current engineers' practice, or the practice on the New York aqueduct tunnel) is that the contractors shall be *paid* for excavation to certain lines, the normal rectangular section (7½ x 11) in one case, and the outline of the masonry arch, side-wall, and invert in the other: it is recognized that to reach these limits the excavation will extend beyond them, but the specifications do not contemplate payment for such exterior excavation; this fact is not made apparent in the limited quotation from the specifications made herein. It must be quite evident that the extent of this outside excavation is largely dependent upon the care and skill of the contractors.

The contractors were advised of this ruling as early as November 5, 1884; the quotation herein from Capt. Symons' letter of May 6, 1885, is incomplete, in omitting the final clause of the paragraph, viz, "in accordance with previous decisions."

The contractors state "when Capt. Symons' order *began* to take effect we appealed to Major Lydecker, under date of January 19th, 1887," &c. In fact the work of lining was in progress at the date of this order, and the amount of brick lining that had been actually put in place and paid for up to the end of January, 1887, was 3,525 cubic yards, or about one-third of the entire amount placed up to the present time, viz, 10,891 cubic yards. Therefore the first appeal from Capt. Symons' ruling was not presented to me when "it *began* to take effect," but more than two years after he made it. In the mean time this ruling had been the basis of estimates submitted to Congress, published in annual reports, and special communications familiar to the contractors, was in full force at the time they entered into their supplemental articles of agreement, having special reference to lining, dated October 18, 1886, and they had without protest placed, and been paid for, lining aggregating in value about $65,000.

The length of the tunnel lined to date is 8,767 feet; the claim of $5.89 per foot for increased compensation presented by the contractors herein therefore amounts to $51,637.63. The appropriation being about exhausted, the work of lining under existing contracts has been discontinued.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee, No. 169.]

A^{d4}.—*Memoranda relating to contract with Beckwith and Quackenbush for Washington Aqueduct tunnel.*

The contractors demand payment for *excavating* beyond the designated limits of the masonry for the lining, on the ground that such is the current engineering practice. This claim is disallowed as not supported by the contract, which expressly stipulates that no payment will be made for excavation beyond the designated limits. But the rock breaks beyond these limits and must be removed by the contractors; they are paid, however, for all *filling* required to replace the rock so removed, at the rate of $4.75 per cubic yard for rubble masonry, or $5.00 per cubic yard for concrete.

The urgent deficiency bill recently passed includes an appropriation for completing the work, with provisos in effect—

1st. That the work may be done under the present contract or by a reletting, at the discretion of the Secretary of War.

2d. That no contract shall be made at prices greater than the prices *allowed* under the present contract.

3d. That the work shall be completed by the 1st of next November.

The work can not be completed at the time indicated, but we can make the nearest approach to doing so by continuing work under the present contract.

When preparing the bill the committee examined closely into the claim of the contractors for an allowance for excavation beyond designated limits and expressed to me the opinion that my ruling in the matter had been correct, though they did not undertake to decide the question at issue, so far as concerned work already done; but said they would incorporate in the bill such restriction as would prohibit the extension of these claims to the remaining work. Such was the purpose of the 2d proviso referred to above, but the language used does not seem to be well selected for the object in view.

Respectfully submitted.

G. J. LYDECKER,
Major of Engineers, U. S. A.

OFFICE WASHINGTON AQUEDUCT,
Washington, D. C., April 9, 1888.

[Committee, No. 170.]

A^{e}.—*Letter relative to claim for extra work by Maloney & Gleason.*

WASHINGTON, D. C., *May 1st*, 1888.

Major G. J. LYDECKER, U. S. A.,
Corps of Engineers:

MAJOR: Inclosed we hand you our claim for work and extra work under our contract for building and completing the new reservoir for increasing the water supply of Washington, D. C., dated the 30th of October, 1883, which we desire may be re-

ferred by the Secretary of War to the Court of Claims for adjudication and settlement under the provisions of section 1063 of the Revised Statutes, and request you to forward the same to the Hon. Secretary for his consideration and action.

Very respectfully,

MALONEY & GLEASON.
J. C. T.

[Sixth indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
Oct. 18, 1888.

Respectfully returned to the Secretary of War, and attention invited to the preceding indorsement and to the report therewith. It is observed that Major Lydecker finds the claim unfounded, except in the following particulars:

Sodding $7\frac{61}{100}$ sq. yards, at 20 c	$1.44
Cut-stone masonry, $2\frac{03}{100}$ cub. yds., at $15	30.[illegible]
Brick masonry, $115\frac{7}{10}$ cub. yds., at $9	1,041.[illegible]
Concrete masonry, $159\frac{4}{5}$ cub. yds., at $5.50	87[illegible]
Rubble masonry, $5\frac{11}{100}$ cub. yds., at $6	34.[illegible]
	1,[illegible]
Trap-rock lining, $2\frac{13}{100}$ sq. yds., at $1	2.13
Broken-stone lining, $176\frac{66}{100}$ cub. yds., at $2	353.[illegible]
Paving, $1,732\frac{07}{100}$ sq. yds., at 28 c	4[illegible]
Pine plank, 547 ft. B. M., at $30 per M	16.41
Total	2,[illegible]
(*o*) Sept. 20, 1884. To boring puddle-core, two men 5 hrs., at 15 c	1.[illegible]

Assistant Engineer Partridge reports that this was done to test depth of clay at bottom of trench. Failure to pay for this was an oversight, and was the result of being grouped in with the large number of unfounded claims which the contractor presented at the same time.

(*p*) Sept. 27, 1884. To boring test pits to discover state of bottom, $3.10.

This work was done to determine nature of bottom of reservoir, and the remarks in relation to the preceding item apply equally to this one.

(*x*) Dec. 10, 1884. To digging for corner-stone near Trumbull st., by order of John Bronizer, inspector, $2.40.

This work appears to have been done by order as stated, and would have been paid at the time had it been specifically presented. Its first appearance was in the general lot of claims for "extras," submitted in March, 1886.

(a^{13}) Oct. 1st, 1885. To 4 iron steps for man-hole in sewer, $1.00

This is a correct charge, and should have been paid for in the October estimate, but it was not reported to me; it would have been paid at any subsequent time, if my attention had been called to the omission by the contractors.

In connection with items under group "A" Major Lydecker remarks as follows: "It will cost the United States about that amount to clear the site of the work of the old buildings, worthless plant, &c., left there by the contractors, and generally to clear up the grounds in the way they should have done before they left the work and as they have frequently promised; but it is quite evident they do not intend to and never will do it."

The specifications (p. 8, lines 2, 3, and 4) require that "on completion of the work and before final payment, the contractor must remove all machinery, rubbish, and refuse material from the site of the work and from the land pertaining thereto."

This office concurs with Major Lydecker's opinion as expressed in reference to this claim, and it further appears that no payment should be made to the claimants even for those items considered admissible until the site is cleared as required by the specifications.

THO. LINCOLN CASEY,
Brig. Gen., Chief of Engineers.

[Seventh indorsement.]

Seen by the Secretary of War. File in the office of the Chief of Engineers.

A copy of Major Lydecker's report, and of the indorsement of the Chief of Engineers of Oct. 18th, 1888, should be sent, with other evidence, in answer to the call from the Department of Justice dated Sept. 5th, 1888.

By order of the Secretary of War.

JOHN TWEEDALE,
Chief Clerk.

WAR DEP'T, *Oct.* 22, 1888.

[Committee No. 171.]

Ac[1].—*Report on each item of claim presented by Maloney and Gleason, contractors, with letter dated May 1st, 1888, for work and extra work on the new reservoir, near Howard University.*

A.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., October 3, 1888.

The items included in this group cover that part of the claim relating only to specified contract work, and differ from the amounts for which payment has been made to the contractors, as shown in the following comparative statement:

Items.	1. Paid for.	2. Claimed.	Excess claimed.		
			Amount.	Price.	Value.
Excavation ..... cub. yds..	872,637	926,613	53,976	$0.30	$16,192.80
Puddling ..... do	61,332	190,490	129,158	.40	51,663.20
Sodding ..... sq. yds..	7,440	7,440	.....	.20	.....
Cut-stone masonry ..... cub. yds..	4.5	5.5	1	15.00	15.00
Brick masonry ..... do	930	935	5	9.00	45.00
Concrete masonry ..... do	9,690	9,775	85	5.50	467.50
Rubble masonry ..... do	104	214	110	6.00	660.00
Trap-rock lining ..... sq. yds..	5,077	5,197	120	1.00	120.00
Broken-stone lining ..... cub. yds..	12,303	13,300	997	2.00	1,994.00
Paving ..... sq. yds..	62,032	63,762	1,730	.28	484.40
Coping ..... lin. ft..	40.9	40.9	.....	5.00	.....
Cast-iron drains ..... do	382	382	.....	.75	.....
Pine plank ..... M ft. B. M..	90,033	92,550	2,517	30.00	75.51
New claim, Class A	.....	.....	.....	.....	71,717.41

The amounts given in the first column of the foregoing statement are derived from actual surveys made monthly by the agents of the United States on the work. I have no idea whence claimants derived the figures contained in the 2d column, but I know they made no systematic surveys of their own. Of the total ($71,717.41) claimed in excess of amounts paid under this head (A), $67,856.00 relates to the first two items.

Concerning the first item—*excavation*—I can only say that I understand the contractors count largely on the theft or loss of some field-notes and cross-section sheets relating to the early part of the work to sustain their claim, to the extent at least of impeaching the completeness of the office records as a basis of settlement. These lost records were in the office of the assistant engineer at the site of the reservoir, whence they disappeared in the spring of 1886, and every effort made since that time to obtain any trace of them has failed. If they are still in existence, and the contractors know of their whereabouts, it may be possible for them to show some ground for their claim, but I doubt it; for the records remaining on file in our office confirm the substantial accuracy of the monthly estimates in respect to this item.

In relation to the second item—*puddling*—the contractors present no explanation in the papers now submitted for consideration, but it is doubtless predicated on an argument presented by their attorney, Mr. E. John Ellis, in a communication addressed to the Hon. Secretary of War, dated March 22d, 1886, and referred to me from the office of the Chief of Engineers, by indorsement dated April 9, 1886, for report.

The argument, briefly stated, was that the use of water from sprinkling carts on the body of the dam in hot, dry weather constituted "puddling." In my report on this matter I stated that without so doing the contractors could not have made, "*next to the water in the reservoir, an ample mass of water-resisting material thoroughly compacted,*" as required by the specifications. About two years before this, under date of June 10, 1884, the contractors presented to this office a claim for extra compensation for sprinkling the dam under the conditions indicated, in reply to which I informed them in a letter dated June 12, 1884, that it was a necessary means for accomplishing what was required of them, and that it came under the following extract from the specifications:

"The contractor will hold himself at all times subject to the instructions of the U. S. engineer in relation to the details of construction of the dam, whereby the whole design of this structure and the true intent of these specifications may be accomplished: these are, in general terms, to have next the water in the reservoir an ample mas-

of water-resisting material thoroughly compacted, and exterior thereto such material as can only be expected to act by its weight in re-inforcing the body of the dam."

It was absolutely necessary to sprinkle this dry and powdery material before it could be "thoroughly compacted" in the work.

The specifications also stipulated that payments on account of the several items included in the proposal will be "in full for all WORK and material required to accomplish and complete everything required by these specifications."

The work in question and the material (water) *were* required for that purpose, and have none of the elements of extra work.

In no case did it approximate "puddling," the specifications for which, as applied to the dam, call for "spreading selected material (clay, sand, and gravel), in such proportions as may be required, in layers of six inches depth, thoroughly incorporating the same by raking and harrowing and then rolling with a heavy grooved roller until thoroughly compacted and united with the preceding layer."

In concluding this part of the subject, it is of interest to institute a comparison between the total amounts claimed by these contractors for *puddling* in March, 1886, and now.

At the former date they had been paid for 56,706 cubic yards, and claimed 182,626 cubic yards additional, the aggregate being 239,326 cubic yards; now, although they have been paid for 4,626 cubic yards since that time, the aggregate claim is for only 190,490 cubic yards. If the amount of the first claim was correct, that now claimed should be 243,952, instead of only 190,490 cubic yards. The comparison simply affords an illustration of the fact that the precise amount claimed is not a matter of much moment, but it must be more than that for which payment has been made. This principle appears to apply generally to the remaining items in this group (A), though each is comparatively small in amount, and the excess claimed on all amounts to only $3,861.41; but the contractors indicate no data whatever in support of their claim for such excess. I will state in this connection, however, that a recomputation of the data in the office shows the following increase in these several items over that considered in payments made, viz:

Sodding $7\frac{31}{100}$ sq. yds., at 20 c	$1.44
Cut-stone masonry, $2\frac{11}{100}$ cub. yds., at $15.00	30.54
Brick masonry, $115\frac{7}{10}$ cub. yds., at $9.00	1,041.30
Concrete masonry, $159\frac{4}{5}$ cub. yds., at $5.50	876.70
Rubble masonry, $5\frac{71}{100}$ cub. yds., at $6.00	34.26
Trap-rock lining, $2\frac{10}{100}$ sq. yds, at $1.00	2.19
Broken-stone lining, $176\frac{89}{100}$ cub. yds., at $2.00	353.32
Paving, $1,732\frac{97}{100}$ sq. yds., at 28 c	484.98
Pine plank, 547 ft., B. M., at $30 M	16.41
Total	2,841.14

It will cost the United States about that amount to clear the site of the work of the old buildings, worthless plant, &c., left there by the contractors, and generally to clear up the grounds in the way they should have done before they left the work and as they have frequently promised, but it is quite evident they do not intend to and never will do it.

The next 45 items, marked (*a*), (*b*), etc., to (a^{19}), inclusive, on contractors' schedule, are claims for extra work, in relation to which I have to report as follows:

(*a*) Taking up stone on lye-wash, 1,150 sq. yds., at 15 c., $172.50.

(*b*) Taking up stone on last flood channel, 4,000 sq. yds., at 15 c., $600.00.

This work was done in the process of excavating trenches for conduits, and was paid for as such at the contract price for excavation. It was the stone paving that had originally been placed in the open flood channel and lye-wash before it was determined to substitute closed conduits in lieu thereof; it was no more expensive than the rest of the excavation, was not claimed as an "extra" by the contractors at the time, nor did it appear as an element in their claim for extras filed in the spring of 1886, at which time all the stone in question had been taken up.

(*c*) Change of centers and knees, by reason of change of slope of sewer, per letter of April 23rd, 1886, $75.00.

The construction and modification of centers is simply a part of the cost of the masonry of conduits under the contract; the cross-sections of conduits varied at different parts of the work, and it was the function of the contractors to supply centers corresponding to each form. No claim for extra compensation was presented at the time, and, as far as I can learn, this is its first appearance on the record. The specifications in relation to "modifications" expressly provide that "no claim for extra allowance on account of such modification will be considered or allowed unless presented in writing to the said (U. S.) engineer by the contractor within 48 hours after receipt of the notice. The fair allowance, if any, to be made will be determined by the U. S. Engineer."

(*d*) West conduit, preparing pile-driver to drive sheet-piling on west slope per letter of May 6, 1886, $94.00

Payment for this work is included in the amount paid for pine plank (group (A), 92,550 ft. B. M. pine plank, at $30 per M., $2,776.50). This price, $30 per M., was that fixed in the letter of May 6th, 1886, for the sheet-piling, driven as directed therein; the preparation of the pile-driver was a necessary step to that end. No objection was noted to the price by the contractors at the time, nor any additional compensation claimed.

(*e*) Additional for quicksand in west conduit trench, changed from open flood channel, 2,800 cub. yds., at 20 c., $560.00.

The contract specifies a payment of 30 cents per cubic yard for all excavation irrespective of the nature of the material excavated, and the contractors were duly paid at that rate; this is the first appearance that I discover on the record of any claim for additional compensation. The statement made by contractors in explanation of this item that the "Engineer supposed there would be no quicksand in this ditch," is incorrect; on the contrary, it was known as a fact that quicksands existed quite generally in that vicinity. But their supposed existence or not has nothing to do with the question.

(*f*) Caulking pipe, $16.00.

I can obtain no information in relation to this item, but presume that it was included in the price paid for laying 382 lin. ft. cast-iron drain, at 75 c. (item, group A).

(*g*) Additional haul on excavation from northern extension, dumped below the dam, 12,000 cubic yards, at 25 c., $3,000.00.

I do not understand this claim. The northern part of the reservoir was about the last part of the work to be excavated, and it was deposited at the foot of the exterior slope of the dam. The length of haul affords no claim for extra compensation, the specifications providing as follows: "No extra allowance will be made for hauling or rehandling any material."

As to the machinery standing idle because of the conditions indicated, I know nothing. I do know very well, however, that the work was greatly delayed, and its cost largely increased by a lack of adequate plant, machinery, and working force during almost the entire period of operations. It was no unusual thing for the machinery or a large part of it to be found idle.

(*h*) Water ramming, west conduit trench, about 484 ft., at 10c. per cubic yard, letter of May 7, 1885, $72.60.

The specifications require that "all work must be the best of its kind, satisfactory in every respect to the U. S. Engineer." The back filling in the conduit trench was found to be carelessly done and insufficiently compacted, and to insure good work the contractors were notified in writing to "water the back filling from that time forward." No claim for extra compensation for so doing was made at the time.

(*i*) To forfeit deducted, the delays in completing the work being attributable to the Engineer Corps, deficient appropriations and changes, and uncertainties of the work, and not properly chargeable to contractors, $1,200.00.

This forfeit was made in accordance with the supplemental articles of agreement dated July 20, 1887, when, after several extensions of time (the original contract requiring completion June 30, 1885), a final extension was applied for and granted on conditions as follows: "In consideration of a further extension of time whereby the party of the second part may be allowed the additional period of four calendar months (viz, from June 30, 1887, to October 31st, 1887), within which to complete * * * the party of the second part shall forfeit to the U. S. the sum of $300 per month during such period of extension, in order to make good in part the additional cost of supervision and inspection to which the U. S. will be subjected by reason of such extension."

No delay in the progress of the work can properly be attributed to the causes stated by the contractors. It was the natural result of either inadequate or insufficient plant and working force, a condition of affairs that existed during almost the entire period of operations, and against which frequent complaint went out from this office.

The remaining items, to (a^{19}) inclusive, were presented by the contractors, through their attorney, E. J. Ellis, in March, 1886, and reported upon in a general way under date of May 24, 1886, but not in relation to each item, as is now required.

(*j*) July 7, 1884. Moving privy in Cottage street, $2.00.

This was done, and is covered by that clause in the specifications which required the contractors to remove buildings, rubbish, &c., from the area * * * "covered by the dam, side channels, or the auxiliary works." The clear intent of the specifications was that the contractors should clear away every obstacle encountered on the site of the work as it progressed.

(*k*) Aug. 11, 1884. Two trays for wheelbarrows, at 75c., $1.50.

Not ordered from this office. Nothing known about them except the contractors'

statement that "they were got by inspector," but to what purpose they were applied they do not state, and I can not imagine.

(*l*) House connection. Sewer on Cottage street, $13.00.

In constructing the west conduit, following the line of College street, the contractors took out a small pipe-sewer, and carried the two house connections then existing on the street into the conduit. It does not appear that they are entitled to any additional compensation, and so far as I can learn from the record, no claim was made at the time. The same remarks apply to item (*s*) below.

(*m*) Sept. 26 to Oct. 1st, 1884. Moving extra dirt on N. E. slope of dam at point nearest stable, $21.00.

This appears to be a charge for disposing of some earth that was roughly excavated from the upper part of a slope, and not moved to the dam, but applied to flattening out the foot of the slope to prevent sliding; it was paid for as excavation, all the contractors are entitled to therefor.

(*n*) Oct. 1, 1884. To 4,620 ft. lumber left in College street sewer-trench, per order J. A. Partridge, assistant engineer, at $14.50, $67.20.

This was not done by order as claimed, but at the contractor's option, and he is not entitled to any compensation therefor. Mr. John A. Partridge reported as follows in relation to this item, in 1886: "The banks of the conduit trench were broken and infirm. Lest the removal of the timber might cause damage to the conduit, the contractors *elected* to leave it in the trench, instead of removing it as they were privileged to do. Anticipating a claim for the value of the timber, it was measured, and found to be 3,360 ft. B. M., which at $14 per M., the cost of the timber would amount to $47.04. It will be observed that the charge is at the rate of $20 per M. *No orders were given to leave the timber in the trench.*"

(*o*) Sept. 20, 1884. To boring puddle core, 2 men, 5 hrs., at 15c., $1.50.

Assistant Engineer Partridge reports that this was done to test depth of clay at bottom of trench. Failure to pay for this was an oversight, and was the result of being grouped in with the large number of unfounded claims which the contractors presented at the same time.

(*p*) Sept. 27, 1884. To boring test pits to discover state of bottom, $3.10.

This work was done to determine nature of bottom of reservoir, and the remarks in relation to the preceding item apply equally to this one.

(*q*) Oct. 7, 1874. To picking up stone on dam and puddle core left after it had been ordered hauled and deposited there, $91.

In relation to this item, I would report that the specifications *distinctly* provide that "no extra allowance will be made for rehauling any material." In addition, the assistant engineer reporting on this claim in 1886 says "cobble-stone, cemented gravel, iron, and roots were carefully excluded from the body of the dam and puddle core. Foremen of gangs were always instructed to exclude such stone, &c., when loading carts, wagons, and excavators. Had they obeyed, there would have been no reason for picking up and hauling away. * * * The stone picked up and hauled was mostly crushed for concrete."

The above report applies equally to items (*u*) and (*z*), hereinafter referred to.

(*r*) Oct. 21st to 23d, 1884. To hauling iron pipe on 4½ st., rolling it back to allow of digging sewer, $25.37.

Asst. Engineer Partridge reports concerning this claim, in 1886, as follows: "In order that they might have space for the excavation of the 75-inch pipe trench and for material for concrete, the contractors rolled the pipe back. The work was for the contractors' convenience."

(*s*) Oct. 23rd, 1884. To sewer connection College st. with Langston's house, $10.

For report in relation to this item, see that on item (*l*) which applies equally to this one.

(*t*) Oct. 21st to 30th, 1884. To bailing water in big pipe where connections are made, $3.

The contractors are required by their specifications to keep all parts of the work clear of water by pumping or otherwise. There appears to be no reason for this charge.

(*u*) Nov. 1st, 1884. Picking up stone on dam and puddle-core, Oct'r, after it had been ordered hauled and deposited, $70.

The report on item (*q*) covers this item also.

(*v*) Nov. 1st, 1884. To removal of surplus earth on N. E. slope of dam, in Oct'r, rammed, rolled, etc., necessitated by changes of slope (see sketch in contractor's bill), $352.37.

Assistant Engineer Partridge reports in relation to this item and to the succeeding item (*w*) as follows: "The location of this work is not clear. If performed where claimed, it may be said there were no errors of engineers. In the estimate of Nov. 1st and Dec. 1st, 1884, there were returned 888 cubic yardsexcavation at 30c., and 747 cubic yards puddle at 40c., amounting to $565.20 for work done at the points claimed.

(w) Dec. 1st, 1884. Ditto for November, $176.25. See report on item (v) above.

(x) Dec. 10, 1884. To digging for corner-stone near Trumbull st., by order of John Bronizer, inspector, $2.40.

This work appears to have been done by order as stated, and would have been paid at the time had it been specifically presented. Its first appearance was in the general lot of claims for "extras," submitted in March, 1886.

(y) Laying 837 ft. of drain-pipe, lower end of sewer-crossing Trumbull st., per order J. A. Partridge, at 10c., $83.70.

This work was done in part, 740 feet only of 6″ terra-cotta drain having been laid by the contractors to conduct the water coming from springs near the west extremity of the dam. It was the simplest and cheapest way for the contractors to obtain a secure foundation. They were paid for 150 cubic yards of excavation in connection with the work, but payment for laying the pipe was refused, in the belief that by furnishing them with the pipe they were saved considerable expense that they would otherwise have been put to in making their work secure.

(z) Dec. 1, 1884. Picking up stone from dam and puddle-core, $35.

My report on item (q) above covers this one also.

(a^1) Dec. 1, 1884. To bailing water from sewer cor. College and 4½ sts., $7.50.

This was required of the contractors by the specifications in relation to draining the work. It was necessary to keeping the water out of the conduit trench during the process of construction.

(a^2) Dec. 1st, 1884. To leveling and sloping lower end of sewer, Trumbull st., $5.70.

An apron of concrete and trap-rock paving was laid in the bed of the creek, extending 28½ feet beyond the head-wall at the sewer outlet. This is the work to which reference is supposed to be made in this claim, and it was fully paid for in the estimate of Dec. 1st, 1884.

(a^3) Jan'y, 1885. Expenses incurred by caving in of sewer cor. College and 4½ sts., Oct., 1884, occasioned by pipe-trench excavated by Government, $209.33.

This resulted entirely from lack of proper precaution on the contractors' part, and they have no reason to call upon the Government to assume any of the resultant expense. The sewer trench at this place passed very close to the trench in which the 48″ pipe had been previously laid on 4½ street, and the necessity for the greatest care in bracing and shoring the former was obvious. It is reported by the assistant engineer that the contractor's foreman in charge of the work was repeatedly warned of the danger of neglecting to do so finally; after a heavy rain the side caved in.

(a^4) Cutting stone for head wall No. 1, Nov. and Dec., per order J. A. Partridge, $279.50.

The specifications called for "coursed rubble" in the head walls, to be made of stone, uniform in height, laid to break joints, not less than 4 inches," and with "face joints which shall not exceed ½ of an inch." To comply with these requirements of the specifications, it was necessary that the stone should be roughly dressed and this was done, but the contractors are entitled to no extra compensation beyond that paid for rubble masonry. This also applies to item (a^{12}) below.

(a^5) Feb. 24, 1885. To handling stone twice; first order being to haul from shaft and to dam as waste rock; afterwards ordered from dam to lye-wash, etc., $29.75.

It was found that some good stone had been thrown with the waste and worthless rock, and the contractors were required to take it out and use it in connection with the work, as required by the specifications; besides, these expressly provide that no allowance will be made for "rehandling any material."

(a^6) June 24, 1885. To 15 yds. of puddled earth removed from west end of puddle core, O'Lawrence, foreman, and removed by Inspector White; also 10 yds. of same June 25th, $4.13.

I hardly understand this item, but it appears that the contractors' foreman removed some puddling that had been put in place, under the impression that it was original earth to be excavated in order to make room for the puddle core of the dam; having taken out the puddle they were required to replace it. I see no reason why the U. S. should pay anything for this mistake.

(a^7) June 26, 1885. To removing porous rock paving in N. E. corner, by order of engineer, and replacing same with suitable rock, $9.80.

As I understand this matter some bad rock was found in the slope paving after it had been laid, and the contractors were required to take it out and substitute good stone. It does not appear that they are entitled to any compensation for so doing.

(a^8) June 20, 1875. To work on east end of dam near head wall; Martin McNamara, foreman; removing puddled earth; change in dam called for by engineer, $330.20.

This claim is so blind that I can make nothing of it, but payment for the work done in the vicinity named was made in the estimates made for July and August.

(a^9) June, 1885. To digging trench for sewage pipe near Soldiers' Home, $37.50.

This work was paid for in the estimates for June.

(a^{10}) Aug. 1 to 17, 1885. To ditto in front of dam, $309.

I have no idea what is meant by this, and am unable to make any report whatever in relation to it.

(a^{11}) June 1 to 17, 1885. To excavating 6 ft. below grade, near stable, for [illegible] of puddle on which to lay paving, per order of J. A. Partridge. This expense was largely increased on account of quicksand, which necessitated bailing and a double hauling of material at 60c., $300.

The record shows 228 cubic yards as the measured excavation for this trench in which that amount of puddle was placed, and the contractors were duly paid for the same at contract rates.

(a^{12}) Aug. 13, 1885. To cutting stone for head wall No. 2, $212.

Report in relation to item (a^4) above applies equally to this one.

(a^{13}) Oct. 1st, 1885. To 4 iron steps for man-hole in sewer, $1.

This is a correct charge and should have been paid for in the October estimate, but it was not reported to me; it would have been paid at any subsequent time if my attention had been called to the omission by the contractors.

(a^{14}) Nov. 11, 1885. To taking out quicksand from part of dam, $9.75.

This work was included in the estimate of Dec. 1st, and payment duly made to the contractors.

(a^{15}) Dec. 1, 1885. To repaving on east main dam in September, the same having been put down on sand as ordered by engineers not proving suitable, Capt. Symon ordered it taken up, Sept. 16, and relaid on broken stone, $125.95.

(a^{16}) Above work continued in October, $19.50.

(a^{17}) Above work continued in November, $71.75.

The work referred to in these three items was all duly measured and paid for; the record showing payment for 306 square yards paving relaid, and 78 cubic yards broken stone for lining.

(a^{18}) Jany. 1, 1886. To sheet-piling around Congressional spring-house, $111.80.

This sheet-piling was measured and a total of 3,250 feet B. M. at $30 per M = $97.50 paid for.

(a^{19}) Jan. 1, 1886. Excavating bottom east of spring-house; our third attempt to do this work, having been twice prevented by engineer's orders heretofore, when such earth could have been easily moved for at least one-third the expense by means of steam-shovel then located at that point, $162.75.

The facts are that when the steam-shovel was at work in this vicinity it came too close to the spring-house, in violation of orders, and damage to the spring was thereby threatened; to avoid this excavation above referred to became necessary, and the earth excavated was replaced by puddled material and the sheet-piling referred to in item (a^{18}) above. The excavation for this purpose and puddling were duly measured and paid for at contract rates.

(b^1) Dec. 12, 1884, to Feb. 5, 1886. To moving steam-shovel and track three times from excavation in N. E. hill, occasioned by change of plan, $1,500.

The expression "change of plan" used by the contractors is apt to mislead. The outline of the reservoir indicated on the original plans was made to conform to the topography in such manner as to obtain the requisite capacity with the least amount of excavation; but it was never intended that this outline should be rigidly adhered to, and the specifications clearly provided that these limits would be defined and marked on the ground; it being the intention that the final location should result from the information developed during the progress of the work, especially as to nature of material encountered. Thus it was that when a considerable area of wet sand was uncovered toward the northern parts of the reservoir, it was determined to keep the bottom in that locality up to a reference of about 129 instead of at 115, the reference of the lower parts of the reservoir. Under these circumstances it became necessary to extend the limits horizontally, in order to make up for the loss of reservoir capacity arising from the reduction in depth. The effect of this was to relieve the contractors from the very great expense to which they would have been put if the excavations of these extensive quicksand beds had been insisted upon, and to substitute an increased amount of excavation under conditions which were the most favorable possible for them, the material being dry, easily excavated, and confined within small limits by reason of the depth of cutting.

The outline adopted was in every respect decidedly in the contractors' favor. This is the first time this claim has appeared, though all the facts on which it is based had taken place prior to the time at which their first considerable batch of claims were filed in March, 1886.

(b^2) April 27, 1886. To relaying track, J. A. Partridge gave stakes on waste dam and ordered the east end of dam filled up. This is a place he ordered not to fill last March 27, and to fill it had to relay 500 feet track and get back to that place, $300.

This was probably done, and was, I presume, necessary for accomplishing the work required of them. It occurred when operations were opening up in the spring, and when but little work was being accomplished by the contractors. The location and adjustment of their plant from time to time, as called for by the requirements of the

work, is simply a necessary means to doing what is required by the contract, and the contractors do not appear entitled to additional compensation on that account.

(b^3) May 6, 1886. To moving steam-shovel back from west end of reservoir to south end and laying track a second time to this point, $500.

This was simply one of the series of changes in location of working plant that had to be done during the progress of the work. I have no knowledge of anything special involved in this move nor any idea the contractors should receive extra compensation therefor.

(b^4) April, 1887. Moving track from the dam to a point south of the dam as per order eng'r, $300.

When operations were commenced in the spring, the place at which the deposit of material was required was indicated to the contractors, and they located their tracks accordingly, in order to perform the work required of them to their own satisfaction and advantage.

(b^5) June, 1887. Moving track back to dam from a point south of dam, as per order eng'r, $300.

When the filling below the dam was completed the tracks were adjusted by the contractors as they saw fit, to accomplish the balance of the work required of them. In all this location and relocation of track the contractors did only what was required of them by their contract. I am sure the assistant engineer gave no directions as to the location of tracks, further than such as might be presumed from his indications to the contractors from time to time of the location in which some filling or excavating was required.

(b^6) April 15, 1884. Loss of profit on excavation of about 84,000 cubic yards not excavated by reason of change of plans from lines defined under agreement of Oct. 4, 1884, at 10c., $8,400.

There was no agreement of Oct. 4, 1884, but certain limits for excavation were then indicated to the contractors, and from time to time the precise limits for finished work were marked out on the ground for them. The estimated amount of excavation named in the specifications, and the amount used in the computation of bids as a basis of award, was 695,000 cubic yards. The amount actually excavated and paid for was 872,637 cubic yards; so that instead of a deficit there was in all a large excess in the amount of excavation over that which the contractors expected to do when they undertook the work, and on which it is presumed they may have made the profit of 10 cents per cubic yard, as claimed.

Referring finally to the examples quoted on the last page of the contractors' statement as examples of why they were delayed, and why they should not forfeit the $1,200, I can only report that they appear to have little or no force. On the 28th of June, 1887, their contract was within two day of its expiration, and the question of refusing any further extension of time was being seriously considered. It is possible that, under the circumstances, Mr. Partridge may have made a remark to the effect quoted, considering the fact that repeated demands had been made on the contractors to increase their force without meeting any response; it might well have appeared unnecessary to take action in that direction, at that late date, until it should be determined that they were to remain on the work to complete it.

The claim that teams had to be drawn off on the 16th of August because there was no work laid out can hardly be correct, for the work to be done was well known to the contractors; it was frequently the case, however, that the precise limits of work had to be outlined by pegs over and over again, because the contractors would take no proper care to preserve them, and it is very probable that this may have been such an occasion.

Respectfully submitted.

G. J. LYDECKER,
Major of Engineers, U. S. A.

To the CHIEF OF ENGINEERS, U. S. A.

[Committee No. 172.]

A^1.—*Indorsement on letter referring to affidavits of Kendall Brothers and J. H. Lucas.*

[1st indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
September 29, 1888.

Respectfully returned to the Secretary of War.

On September 25, 1888, there were left at this office, without file marks or instructions, two affidavits by parties alleging to the effect that work had been performed

on the tunnel for the extension of the Washington Aqueduct falling far below the specifications, and that those inspecting the work being done had neglected their duty and had allowed very inferior work to pass their inspection, &c. These papers were referred September 26, 1888, to the officer in charge for report at as early date as is practically consistent with the necessary investigation.

Thorough investigation will be required by this department, and when the facts are established the fixing of responsibility for any neglect of duty will then be next in order.

THOS. LINCOLN CASEY
Brig. Gen., Chief of Engineers.

[Committee No. 173.]

A8.—*Major Lydecker calls attention to the impossibility of completing the Washington Aqueduct extension by November 1, 1888.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D, C., October 2, 1888.

The CHIEF OF ENGINEERS, U. S. ARMY,
Washington, D. C.:

SIR: The "act to provide for certain of the most urgent deficiencies in the appropriations for the services of the Government for the fiscal year ending June 30, 1888, and for other purposes," contains the following concerning the increase of water supply: "Washington, D. C. * * * For completion of lining of the tunnel * * * in all, $355,000, all of said work to be completed by November 1st, 1888."

Immediately on learning that the bill, as passed by Congress, contained the above provision as to time of completion, and prior to its approval by the President, I reported to the Chief of Engineers, in a letter dated March 29, 1888, that it would be entirely impossible to comply with that requirement, of which fact I desired to make the earliest possible official record, and stated my reasons therefor. Recent action in Congress indicates that the provision referred to will not be modified, and I would now respectfully request instructions as to whether all operations on the tunnel must be suspended on the date named. If the accounting officers of the Treasury will audit any expenditures after that date it is highly desirable that operations be continued, in order that the tunnel may be completed at the earliest date possible; and not only that, but, in view of the proposed investigation, which I most earnestly desire, it is necessary that the tunnel be kept free from water and desirable that operations be continued, so that the precise manner in which the details of work are and have been carried on may be plainly seen.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers.

[First indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
October 2, 1888.

Respectfully submitted to the Secretary of War.

It appearing from the within that it will be entirely impossible to comply with the requirement of the act of March 30, 1888, that all work in the tunnel shall be completed by November 1, 1888, it is requested that the opinion of the Second Comptroller be asked as to whether, in that event, the appropriation is available after that date.

THOS. LINCOLN CASEY,
Brig. Gen., Chief of Engineers.

[2d indorsement.]

WAR DEPARTMENT,
Oct. 2, 1888.

Respectfully referred to the Second Comptroller for decision as requested in the first indorsement.

By order of the Acting Secretary of War.

JOHN TWEEDALE,
Chief Clerk.

(FORM 24.)

TREASURY DEPARTMENT,
SECOND COMPTROLLER'S OFFICE,
October 4, 1888.

Respectfully returned to the Acting Secretary of War. As the First Comptroller, and not the Second, has the settlement of all accounts and claims relating to the Washington Aqueduct, I can not see that I have jurisdiction of the matter referred to in the within letter of Major Lydecker of October 2d. Therefore, I must decline to express my views as requested. I think this a fitting opportunity to suggest to you that there is an apparent misapprehension in the office of the Chief of Engineers regarding the respective jurisdiction of the First and Second Comptrollers.

The First Comptroller finally settles all accounts of engineer officers covering civil expenditures in or pertaining to the District of Columbia. Engineer officers' accounts other than the above are finally settled by the Second Comptroller. Following that distinction the Second Comptroller should not express his views touching expenditures on the Washington Aqueduct. And in the same way the First Comptroller, it would seem, had no good ground for stating his opinion on Sept. 27, 1888, in answer to the request of the War Department of Sept. 24, 1888, that the Secretary of the Treasury give an interpretation of certain sections of the River and Harbor bill of Aug. 11, 1888. All accounts of engineer officers for expenditures under river and harbor appropriations are finally settled by the Second Comptroller, and not the First.

SIGOURNEY BUTLER,
Comptroller.

[4th ind't.]

Respectfully referred to the First Comptroller of the Treasury, with request for decision.

By order of the Act'g Sec'y of War.

JOHN TWEEDALE,
Chief Clerk.

WAR DEPT., *Oct.* 8, '88.

[5th indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
October 11, 1888.

Respectfully returned to Major G J. Lydecker, Corps of Engineers, and his attention invited to the letter of the First Comptroller.

By command of Brig. Gen. Casey.

CLINTON B. SEARS,
Captain of Engineers, U. S. A.

[6th indorsement.]

OFFICE WASHINGTON AQUEDUCT,
Washington, Oct. 12, 1888.

Respectfully returned to the Chief of Engineers, U. S. A., with report and recommendation concerning the letter of the First Comptroller, referred to in the 5th indorsement.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[7th indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
October 15, 1888.

Respectfully submitted to the Secretary of War, inviting attention to the report of Major Lydecker, which is concurred in by me.

THOS. LINCOLN CASEY,
Brig. Gen., Chief of Engineers.

[Committee No. 174.]

A^{61}.—*Major Lydecker's report on decision of the First Comptroller.*

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., October 12, 1888.

The CHIEF OF ENGINEERS, U. S. ARMY,
Washington, D. C.:

GENERAL: The letter from the Hon. First Comptroller, dated October 10, 1888, containing his decision of the question raised in my letter of the 2d instant, is just received, and I have the honor to submit the following report and recommendation in relation thereto.

The decision at which the Comptroller has arrived is as follows: "In view of the plain and explicit provisions of the statute as to the time within which said work must be completed, as well as the terms of the contract above referred to, I am of opinion that the accounting officers of the Treasury are not authorized to audit any account for *work* done or *material* furnished in the construction of said aqueduct after the 31st day of October, 1888."

The opinion is also expressed "that the honorable Secretary of War is not authorized to extend the time for completion, unless Congress shall so provide."

If this interpretation of the law is to be controlling in the matter all work on the tunnel must cease at the end of the current month, unless some action can yet be taken in Congress to set aside the time limit prescribed in the deficiency act of March 30, 1888. Operations being so suspended, not only will the completion of the structure be indefinitely delayed, but a thorough examination of the work in progress and already done will become impossible, for the reason that the tunnel will fill with water, so as to become inaccessible in a few hours after the work of pumping is stopped.

Under these circumstances I am impelled to recommend that a copy of the Hon. First Comptroller's decision be transmitted to each house of Congress for their information, and such action, if any, as they may deem proper.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 175.]

A^{62}.—*First Comptroller's decision on accounts for work done and materials furnished after October* 31, 1888.

TREASURY DEPARTMENT, FIRST COMPTROLLER'S OFFICE,
Washington, D. C., October 10, 1888.

CHIEF OF ENGINEER, UNITED STATES ARMY,
Washington, D. C.:

SIR: I have examined the letter of G. J. Lydecker, Major of Engineers, to you, dated October 2, 1888, which you referred to the honorable Secretary of War on the 2d instant, and which the chief clerk of the War Department, on the same date, in accordance with your request, referred to the Second Comptroller for his opinion. The Second Comptroller, on the 4th instant, expressed the opinion that the matters involved should be submitted to this office, and the chief clerk of the War Department, following that suggestion, on the 8th instant referred the letter to me for decision. The letter of Major Lydecker begins with the following quotation:

"The 'act to provide for certain of the most urgent deficiencies in the appropriations for the services of the Government for the fiscal year ending June 30, 1883, and for other purposes,' contains the following concerning the 'increase of water supply, Washington, D. C.' * * *: 'For completion of lining of the tunnel * * * in all, $355,000, all of said work to be completed by November 1st, 1888.'"

The letter then continues:

"Recent action in Congress indicates that the provision referred to will not be modified, and I would now respectfully request instructions as to whether all operations on the tunnel must be suspended on the date named. If the accounting officers of the Treasury will audit any expenditures after that date, it is highly desirable that operations be continued in order that the tunnel may be completed at the earliest date possible."

It will be observed from what is cited above from the act of Congress that there is a limit to the time within which the work is to be completed. I find in the contract made by Major Lydecker on behalf of the United States with Beckwith & Quacken-

bush, to perform the work specified in said appropriation, which contract was made and entered into on May 8, 1888, the following provision:

"That the parties of the second part shall continue to completion, so far as the money already appropriated shall suffice, the work on the tunnel aforesaid, it being expressly understood that the parties of the second part shall use all means in their power to complete the work by the first day of November, 1888, and that all instructions from the party of the first part concerning the steps to be taken to insure completion on said date shall be promptly obeyed and rigidly adhered to."

Another provision of said contract is as follows: "In consideration of the first proviso of the urgent deficiency act hereinbefore named, it is also understood and agreed that if the work on the tunnel is not completed by the first day of November, 1888, the parties of the second part may, at their option, continue to prosecute the work within the limits provided for by the appropriation of $355,000 made by Congress in the act herein named; but no payment for such work done or material furnished after said date shall be made until Congress shall have extended the time for the completion of the work unless the Secretary of War shall then determine that the time for completion under these articles of agreement may be extended and shall thereupon expressly authorize payment to be made in the usual manner for the work during the period of extension."

It will also be observed that the parties above mentioned in making a contract for performing said work had in view the time within which it was provided that the same should be completed. Time was an important element in making said contract; so much so that no payment for work done or material furnished after the time specified in the act should be made until Congress should have extended the time for the completion of said work. It is true that the clause—

"Unless the Secretary of War shall then determine that the time for completion under these articles of agreement may be extended, and shall thereupon expressly authorize payment to be made in the usual manner for the work during the period of extension" was inserted, yet I am of opinion that the honorable Secretary of War is not authorized to extend the time for completion unless Congress shall so provide.

In view of the plain and explicit provisions of the statute as to the time within which said work must be completed, as well as the terms of the contract above referred to, I am of opinion that the accounting officers of the Treasury are not authorized to audit any account for any work done or material furnished in the construction of said aqueduct after the 31st day of October, 1888.

Without arguing the question presented by the Hon. Second Comptroller I desire to say that my action in expressing an opinion in regard to the question which the War Department propounded to the honorable Secretary of the Treasury in reference to the river and harbor bill of August 11, 1888, and which was referred to me by the honorable Secretary of the Treasury, was correct and strictly in the line of my duty prescribed by law, and in accord with the precedents and decisions of my predecessors from the foundation of the Government down to the present time. It is true that the accounts presented by those disbursing funds appropriated under the river and harbor act are to be settled by the honorable Second Comptroller, who is authorized to countersign all requisitions drawn by the Secretary of War on the Secretary of the Treasury for funds with which to pay said accounts, as prescribed in section 3673 of the Revised Statutes; but it is made the duty of the First Comptroller to countersign all warrants drawn by the Secretary of the Treasury which "shall be warranted by law." This being the case, the First Comptroller must pass upon the legality of the payments involved in these warrants. Hence the propriety of the opinion of this office becomes apparent. If in the opinion of the First Comptroller the payment was not authorized by law, he would refuse to countersign the warrant.

The letter of Major Lydecker to you, with the various indorsements thereon, is herewith returned.

Respectfully, yours,

M. J. DURHAM,
Comptroller.

[Committee, No. 176.]

A[1]—*Indorsement on Major Lydecker's report upon affidavits of Kendall Brothers and Thomas Lucas.*

[3d indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
October 17, 1888.

Respectfully submitted to the Secretary of War.

The report of Mayor Lydecker upon the affidavits referred to him concerning the character of the work done upon the lining of the tunnel of the extension of the

Washington Aqueduct renders it certain that the work is defective and not of the kind required by the contract. I have therefore to recommend that a court of inquiry be ordered to examine into the entire matter of the lining of the tunnel and to fix the responsibility for the character of the work executed.

THOS. LINCOLN CASEY,
Brig. Gen., Chief of Engineers.

[Committee, No. 177.]

A[2].—*Letter recommending extension of time for completing the Aqueduct tunnel to December* 1, 1888.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., October 29, 1888.

The CHIEF OF ENGINEERS, U. S. ARMY,
Washington, D. C.:

GENERAL: The Hon. Attorney-General, in his opinion dated October 25, 1888, concludes that the Secretary of War not only has power to extend the time for completion of the Washington Aqueduct tunnel beyond November 1, 1888, but that it is his duty so to do, if in his judgment the public interests will thereby be promoted.

It is my opinion that the public interests require that the contracts under which operations on the tunnel are now being carried on should be kept alive during the progress of the current investigations concerning the work, to the end that the tunnel shall be kept clear of water and that the rock which has already been blasted in enlarging the tunnel to lining section may be taken out.

I therefore submit the recommendation that the time for completing said tunnel under the articles of agreement now in force be for the present extended to December 1, 1888, operations during such period to be limited to the work of pumping and "mucking." The work of pumping is, as I am informed, authorized by a joint resolution of Congress, though I have not yet seen it; the work of "mucking" does not become an item of charge against the United States until the lining is placed, and the removal from the tunnel of all the loose rock by which it is now obstructed will greatly facilitate and expedite the work of repairing and completing the masonry lining when such work shall finally be authorized.

Very respectfully, your obedient servant,

G. J. LYDECKER,
Major of Engineers, U. S. A.

[1st indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,
October 30, 1888.

Respectfully submitted to the Secretary of War.
Approved.

THOS. LINCOLN CASEY,
Brig. Gen., Chief of Engineers.

[Special.]

Seen by the Secretary of War. The order of the Department on this subject will be found on a letter from Senator Edmunds, sent to the Chief of Engineers this day.

By order of the Secretary of War.

JOHN TWEEDALE,
Chief Clerk.

WAR DEPT., *Oct.* 31, '88.

[Committee No. 178.]

P. F. Brennan's receipt to Beckwith, Quackenbush & Co.

Received of Beckwith Quackenbush & Co. Four thousand fifty eight dollars and four cts being eighty five per cent of $4,774.$\frac{17}{100}$ retained percentage. This being settlement in full of all demands to date. Except, fifteen per cent on $4774.$\frac{17}{100}$ amounting to seven hundred and sixteen dollars and thirteen cents, balance retained now Cr in account which will be paid on finale settlement when the work is complete as per agreement with P F Brennan & Beckwith Quackenbush & Co Dated Feby 24th 1885—

GEORGETOWN D C *January* 26, 1888

P F BRENNAN
L A EMERY

[Committee No. 179.]

Memorandum of agreement made between P. F. Brennan and Beckwith, Quackenbush & Co.

Memorandum of agreement made & concluded this 24th day of February in the year 1885 by and between P. F. Brennan of Waterbury Connecticut, party of the first part, & Beckwith Quackenbush & Co. of Washington D. C party of the second part Witnesseth;

For & in consideration of the payments and considerations hereinafter mentioned the said P. F. Brennan hereby agrees & by these presents does agree to build & complete & finish in every respect & to the satisfaction and acceptance of the engineers & inspectors in charge of the work all the brick masonry, concrete masonry & dry stone packing necessary ordered or required by said engineers in the Tunnel or shafts of the Washington Aqueduct Tunnel now being constructed by the party of the second part & the said P. F. Barnum agrees to furnish all labor skilled & common & all the tools required by said laborers & to prosecute the work in such manner as to cause as little delay as possible to the driving of the Tunnel & which shall be satisfactory to the engineers & inspectors in charge of said work, both as regards progress & delay to said work of driving the headings—it being understood & agreed by & between the parties to this agreement that the considerations hereinafter mentioned are ample adequate & satisfactory for the full performance of the work embraced in this agreement & all necessary delay occasioned by transporting rock & empty cars to & fro past the points of working but said P. F. Brennan is to have the right of way with all cars loaded with material for the work going down the shaft but is to unload & clear the main track in tunnel at once to prevent delay to party of second part.

For & in consideration of the above work well & truly done according to the intent & meaning of the above specifications the said Beckwith Quackenbush & Co. party of the second part, agree to furnish all the brick, sand, cement, broken stone & rock suitable for dry stone packing as near the shaft as they conveniently can & in case rock is suitable for dry stone packing which comes from heading nearest the working point, agree to select & unload same at end of centres in tunnel convenient for use & also agree to furnish all the cars, forms, profiles, logging, ribs, wedges, lumber for staging & mortar beds or boxes necessary & required for said work, & also raise & lower all the cars in the shafts—it being however understood & agreed that loaded cars from the headings are to have the right of way over all other cars & the party of the second part further agree to pay to said P. F. Brennan monthly as the same shall be estimated by the engineers in charge of the work whose estimate is mutually understood & agreed shall be final & binding upon the parties to this agreement:

For all brick masonry the sum of two dollars & seventy five cents per cubic yard.

For all concrete masonry the sum of one dollar & fifty cents per cubic yard.

For all dry stone packing the sum of seventy-five cents per cubic yard reserving ten per cent. from each estimate until the final estimate as security for the faithful performance of the above agreement & it is further mutually understood & agreed by the parties to this agreement that the party of the first part is to be paid the actual cost for any necessary moving of track air-pipe & ventilating boxes which may be in the way of his work & the said party of the first part further agree to keep in order the track air pipe & ventilating boxes where same passes the work he has in course of construction for the consideration before mentioned

In witness whereof the parties to this agreement have hereunto set their hands & seals on the day date & year first above written

P F BRENNAN [SEAL.]
BECKWITH QUACKENBUSH & CO. [SEAL.]

Witness
NEL. J DAVIS.

MEMORANDUM OF AGREEMENT

We the undersigned herein acknowledge ourselves to be equal parties in the "*attached*" contract with Beckwith Quackenbush & Co for doing the mason work in Washington Aqueduct Tunnel as specified in said contract signed by P. F. Brenan & Beckwith Quackenbush & Co. dated February 24th, 1885.

It is mutually agreed and understood between us that it shall be right & lawful for either of us to receive moneys due from Beckwith Quackenbush & Co. on settlement of monthly estimates as specified in said contract.

And it is further understood that we are equally interested in doing the work & that each of us are entitled to one half of the proceeds from the monthly estimates also percentages *retained* on completion of the work

We further agree that payments due from estimates may be paid to either of us whether both parties are present or not & that this article shall be attached to said contract & in full force after this date

P. F. BRENNAN
L. A. EMERY

GEORGETOWN D. C. *December* 23d 1885
Witness
Nel. J. DAVIS

[Committee No. 180.]

Memorandum of agreement made between P. F. Brennan and J. F. Palmer, parties of the first part, and Beckwith, Quackenbush & Co., parties of the second part.

Memorandum of Agreement made and concluded this 8th day of May in the year 1888 by and between P F Brennan of the City of New York and J F Palmer of Washington, D. C., Parties of the first part and Beckwith Quackenbush & Co of Washington, D. C. Party of the second Part. Witnesseth,

For and in consideration of the payments and conditions hereinafter mentioned the said P F Brennan and J F Palmer agrees and by these Presents does agree to build and complete and finish in Every respect and to the Satisfaction and Acceptance of the Engineers and Inspectors in Charge of the Work all the Brick Masonry, and Rubble Masonry in Side walls, and all Rubble Packing and concrete necessary ordered or required by said Engineers in the Tunnel of the Washington Aqueduct Tunnel now being constructed by the Party of the Second Part and the said P F Brennan & J F Palmer agree to furnish all Labor skilled and Common and all tools necessary and required by Said Laborers and to Prosecute the work in such manner as to cause as little delay as possible to the trimming of the Tunnel and which shall be Satisfactory to the Engineers and Inspectors in charge of the work of trimming the Tunnel it being understood and agreed by and between the parties to this Agreement that the Considerations hereinafter mentioned are ample adequate and Satisfactory for the full performance of the work embraced in this agreement and all necessary delay Occasioned by transporting Rock and Empty cars to and fro past the Points of working but said P F Brennan and J F Palmer is to have the Right of way with all Cars loaded with material for the work going down the Shaft but is to unload and clear the main track in Tunnel at Once to Prevent delay to Party of second Part.

For and in consideration of the above work being well and truly done according to the intent and meaning of the above Specifications the said Beckwith Quackenbush & Co Party of the second Part agree to furnish all the Brick, Sand, Cement, broken Stone and Rock Suitable for Rubble Masonry in side walls, Rubble Packing & concrete as near the shaft as they conveniently can and in case Rock is suitable for Rubble Side Walls and Rubble Packing which comes from trimming nearest the working Point agree to select and unload same at End of Centers in Tunnel convenient for use and also agree to furnish all the cars, forms, profiles, lagging Ribs, wedges, lumber for Staying and mortar beds--or boxes necessary and required for said work, and also raise and lower all the Cars in the Shafts, it being however understood and agreed that loaded cars from the trimmings are to have the right of way over all other cars and the Party of the Second Part further agree to pay to said Brennan & Palmer monthly as the same shall be estimated by the Engineers in charge of the work whose Estimate is mutually understood and agreed shall be final and binding upon the Parties to this Agreement.

Brick, $2.75.—For all Brick Masonry the of sum two dollars and Seventy five cents per cubic yard.

Rubble, $1.50.—For all Rubble Side wall Masonry 18-inches thick the sum of one Dollar and fifty cts per cub yd.

Packing, $1.25.—For all Rubble Masonry Packing the sum of One Dollar and Twenty five cents per cubic yard.

Concrete masonry, $1.50.—For all Concrete Masonry one dollar and fifty cents per cubic yard.

Reserving ten per cent. from each estimate until the final Estimate as security for the faithful performance of the above Agreement.

And it is further mutually understood and agreed by the parties to this agreement that the Party of the first part is to be paid the actual cost for any necessary moving of Track, Air-Pipe, and Ventilating boxes which may be in the way of his work, and the Said Party of the first part further agree to keep in order the Track, Air Pipe and Ventilating boxes where Same Passes the work he has in course of construction for the consideration before mentioned.

Material.—And it is further and finally agreed by the Party of the first Part to handle all material with great care," and not allow any unnecessary waste of material or Damage to Property under their charge to the Satisfaction of the Engineer & Inspectors in charge of the Works.

In Witness Whereof the Parties to this agreement have hereunto set their hands and seals on the day, date and year first above written.

Witness
NEL J. DAVIS.

P F BRENNAN [SEAL]
J F PALMER [SEAL]
BECKWITH QUACKENBUSH & Co [SEAL]

[Committee No. 181.]

Statement of money paid to Brennan and Pamer, for work on Washington Aqueduct Tunnel.

Month of May 1888	952.01	Month of Oct. 1888	3,522.92
" " June 1888	4,806.70	" Nov. 1888	689.96
" " July 1888	6,751.60		
" " Aug 1888	4,160.66	Total	$23,808.78
" " Sept 1888	3,424.88		

[Committee No. 182.]

Statement of money paid Brennan and Emery, for work on Washington Aqueduct Tunnel.

Month of March 1885	$1,200.38	Month of Dec. 3rd to 4th 1886	$567.52
" " April 1885	1,268.42	" " " 4th to 31st 1886	2,137.05
" " May 1885	1,470.77	" of Jan'y 1887	3,017.25
" " June 1885	1,127.66	" " Feb'y 1887	3,917.51
" " July 1885	1,224.70	" " March 1887	4,802.00
" " Aug 1885	780.84	" " April 1887	4,503.00
" " Sept 1885	386.50	" " May 1887	4,827.50
" " Oct 1885	1,137.17	" " June 1887	5,479.25
" " Nov. 1885	727.65	" " July 1887	5,401.00
" " Dec 1885	439.44	" " Aug 1887	5,879.00
" " Jan'y 1886	726.41	" " Sept 1887	4,815.75
" " Feb'y 1886	190.25	Months of Oct. Nov. Dec 1887	6,364.16
" " Oct 1886	215.63	Percentage ret Jany 1888	4,774.17
" " Nov. 5th to 12th 1886	442.92	Apl. May July 1888	716.13
Nov. 1, 10 per cent. retained to date	1,223.63		
Month of Nov. 12 to 30, 1886	980.98	Total	$70,744.64

[Committee No. 183.]

Letter of Secretary of War, inclosing report of Major Lydecker.

WAR DEPARTMENT,
Washington City, December 7, 1888.

SIR: In reply to your request of the 24th ultimo, to be informed of the amount of water pumped from the tunnel by estimated monthly averages from the time of its commencement to the present date I have the honor to inclose a copy of a report of the 4th instant from Maj. G. J. Lydecker, Corps of Engineers, from which it will be seen that the record of operations does not contain data to show the amount of water pumped from the tunnel by estimated monthly averages from the time of its commencement to the present date. The report however contains an estimate of the daily flow into the tunnel as indicated by the time taken the tunnel to fill with water to the

to the level at which it commenced to flow out at the Rock Creek shaft, estimating from the time at which all pumping was stopped when operations were suspended December 1, 1887.

Very respectfully,

WM. C. ENDICOTT,
Secretary of War.

Hon. GEORGE F. EDMUNDS,
Chairman, Joint Committee of Inquiry on Washington Aqueduct Tunnel, United States Senate.

[Committee No. 184.]

Major Lydecker's estimate of daily flow into the tunnel.

OFFICE WASHINGTON AQUEDUCT,
Washington, December 4, 1888.

Respectfully returned to the Chief of Engineers, U. S. A.

The record of operations does not contain data to show "the amount of water pumped from the tunnel by estimated monthly averages from the time of its commencement to the present date." The daily flow into the tunnel has been estimated, however, at 255,000 gallons, in round numbers—as indicated by the time taken for the tunnel to fill with water to the level at which it commenced to flow out at the Rock Creek shaft, estimating from the time at which all pumping was stopped when operations were suspended December 1, 1887.

G. J. LYDECKER,
Major of Engineers, U. S. A.

[Committee No. 185.]

Letter of Major Lydecker furnishing information asked for.

OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C. December 5, 1888.

Hon. GEORGE F. EDMUNDS,
Chairman Investigating Committee on Washington Aqueduct Tunnel,
Washington, D. C.:

SIR: Certain items of information called for by your committee when I was before it are herewith respectfully transmitted, as follows:

1. Tracing showing profile of Aqueduct Tunnel, as proposed before work on the same had been commenced. (Enclosure marked A)

2. All applications, and recommendations on file in this office relating to appointments of Civil Engineers and Inspectors. *These papers, 141 in all, are original papers taken from the files of the office, and it is especially requested that they be returned as no copies of them have been retained.* (141 Enclosures in package marked B)

3. Copies of telegrams concerning bid of Dewees & Co. (Enclosure C)

4. Tracing showing result of examinations recently made to ascertain approximately the amount of deposit at the Distributing Reservoir. (Enclosure marked D.)

5. Abstract of expenditures, classified, on account of the Aqueduct extension. (Enclosure marked E)

6. The number of feet of lining finished up, in the tunnel, since the date of the discharge of Inspector Masters is 4500 feet. The Congressional Document in which a tunnel is proposed by General Meigs as a means of extending the Washington Aqueduct is *Senate Mis. Doc. No.* 58. *45th Congress, 3rd Session.*

Very respectfully,

G J LYDECKER
Major of Engineers, U. S. A.

[Committee No. 187.—Telegram]

Copies of telegrams concerning bid of Dewees & Co.

GEORGETOWN, D C. *October* 10, 1883

To CLINTON BECKWITH,
Herkimer, N. Y.

Have you arranged to supply J. H. Dewees and Company with any plant for constructing water works tunnel in this city in case contract is awarded to them? If so please state how much.

G. J. LYDECKER
Major Engineers

[Telegram.]

HORKIMER, N. Y. *October* 10, 1883

To G. J. LYDOCKER,
Major Engineer, Wash. D. C.

No sir. Have made no arrangements with them of any kind.

CLINTON BECKWITH

[Committee No. 189.]

Abstract of expenditures, classified, on account of the Aqueduct Extension—to November 30, 1888, inclusive.

Beckwith & Quackenbush, Contractors, before May 8, '88	916,986,80
Beckwith & Quackenbush, Contractors, since May 8, '88	95,450,85
Engineering and superintendence	33,170,90
Office pay rolls	12,628,44
West connection, May to July 1885	5,053,58
West connection, July to Nov. 1888	3,686,23
Instruments—levels, theodolites, tapes, &c	1,466,14
Advertising	462,22
Forage	345,33
Mileage	262,56
Stationery	173,87
Building signal stations	143,44
Rubber clothing	134,30
Dripping pipes	131,01
Printing specifications and blanks	118,94
Iron steps for the connecting shafts	91,90
Torches, lanterns, oil, &c. used in tunnel	83,31
Miscellaneous	247,01
Total expenditures to November 30, 1888	1,070,636,83
Balance unexpended	283,897,72
Total appropriation	$1,354,534,55

APPROPRIATIONS.

July 15, 1882	599,534,55
March 26, 1886. (Pumping)	5,000,00
August 4, 1886	395,000,00
March 30, 1888	355,000,00
	$1,354,534,55

[Committee No. 190.]

Letter of I. P. Klingle showing wastage of present water

P. O. Box 364
Washington City Dec. 20, 1888

Hon. S. F. EDMUNDS
Chairman Joint Committee

SIR: While I have no suggestions to offer to your committee as to what may be advisable on the question of continuing the work on the tunnel for supplying an increased amount of water to the city of Washington, I think I may venture to call the attention of the committee to the actual facts regarding the present supply of water and show the reason why the present ample supply falls short of filling the needs, not only of the existing population but also of the increased population which will occur during the present generation.

First—The water is wasted.

Second—If the waste be allowed to continue, no reasonable increase of supply can afford a remedy.

Third—The waste must be stopped.

Referring to the annual reports of the Commissioners of the District of Columbia submitted to Congress, I will cite these reports as occasion may require for the data herein

The capacity of the mains is as follows: (Report 1876, Page 82)

36 inch main gallons, per diem	17,935,200
30 " "	11,368,800
12 " "	1,150,560
Number of gallons per day=	30,454,560

Premises supplied with water

(Report 1887, Pages 474–475.)

Two story houses	13,530
Three "	7,341
Four "	3,532
Five "	241
Six "	5
Eight "	1
	24,650
Miscellaneous	4,774
	29,424

It will be noticed that houses of two stories constitute about 46 per cent of the premises supplied. The number of residences supplied being 24,650, it may be assumed that for the year ending June 30, 1887, 123,250 persons were furnished with water. Leaving out of view the amount consumed by the United States, the capacity of the mains, being as above, 30,454,560 gallons per day, the 29,424 persons supplied during the fiscal year 1886–1887 had an average supply of 1,035 gallons of water per day to each of the premises so supplied.

An average of 1,000 gallons actual daily consumption of water in 4,774 premises classified as "miscellaneous" will show 4,774,000 gallons per diem as the aggregate, while 200 gallons will furnish an ample average daily supply to the 24,651 houses occupied as residences, giving 4,930,000 gallons per day as the supply to this class of water-takers.

In country towns where houses are supplied from cisterns, the water being pumped by hand to the tanks supplying the bath-rooms 100 gallons of water per diem is an abundant average supply for a family.

Supply to 24,651 houses @ 200 gal. per diem	4,930,000
" 4774 miscellaneous 1,000 "	4,774,000
	9,704,000

From the foregoing it may be assumed that 10,000,000 gallons, or one third of the daily capacity (30,454,560 gallons) of the mains, is quite sufficient for the average daily needs of the present population of this district.

At page 503, report Commissioners D. C. for 1887, a table is given which shows the average hourly flow of water through the mains for a period of seven years 1881-1882-1883-1884-1885-1886-1887.

	Gallons.		Gallons.
6 to 7 a. m	1,087,218	8 p. m. 9 p. m	1,160,867
7 " 8 "	1,166,913	9 " 10 "	976,308
8 " 9 "	1,186,019	10 " 11 "	1,015,460
9 " 10 "	1,265,639	11 " 12 midnight	1,014,817
10 " 11 "	1,124,426	12 " 1 a. m	954,594
11 " 12 m	1,143,338	1 to 2 a. m	997,798
12 m. to 1 p. m	1,182,926	2 " 3 "	897,709
1 " 2 "	1,133,685	3 " 4 "	952,930
2 " 3 "	1,205,145	4 " 5 "	991,896
3 " 4 "	1,093,537	5 " 6 "	1,050,697
4 " 5 "	1,167,485		
5 " 6 "	1,160,749	Total average for 24 hours—7 years	26,147,953
6 " 7 "	1,119,407		
7 " 8 "	1,099,187		

Comparing the flow of water through the mains at the busiest hours of the day with the flow during that hour of the night when the flow is at the minimum, it

will be seen that at the dead hour of the night the minimum flow is but 22 per cent. less than that at the hour of the morning when the consumption of water is at the maximum, as follows:

	Gallons.
9 to 10 a. m. average flow	1,265,639
2 " 3 " " "	897,709
Difference	467,930

It may safely be assumed that 75 per cent. of the flow between the hours of 2 a. m. and 3 a. m. is actual waste, which waste amounts to 673,282 gallons during that particular hour. The same amount of waste must occur during each hour of the day. The above amount of 673,282 gallons per hour multiplied by 24 gives 16,158,768 gallons run to waste every day, which amount thus run to waste is more than one-half the full capacity (30,454,560 gallons per day) of the mains.

In an article in the "Scientific American" published October 11, 1879, commenting on the waste of water in large cities, it is said, "On the introduction of waste-water meters in Liverpool it was found that out of every hundred gallons supplied seventy gallons were allowed to run to waste." In the present case the proportion of waste is about the same.

The average amount delivered daily, as per table above, is 26,147,953 gallons, of which 70 cent = 16,303,567 gallons, which result is sufficiently close to the result (16,158,768 gallons per diem) as shown above.

Whether or not the amount of waste as herein indicated be really as large as the above showing will make it appear, it will be useless, nevertheless, to increase the water supply in any hope whatever to surmount this immense and inexcusable loss. The present means of supply is sufficient for a population double that which is now here. So that under ordinary circumstances the increase of the water supply is a subject to occupy the attention of the next generation and does not really confront us at this time.

In the report of the Commissioners for the year 1877, page 87, the following table is given to show the average number of gallons of water to each inhabitant in the cities named

	Gallons daily.		Gallons daily.
Washington	155	London, England	29
New York	100	Liverpool, "	25
Brooklyn	52	Paris, France	28
Baltimore	50	Tours, "	22
Chicago	65	Berlin, Prussia	20
Boston	60	Dublin, Ireland	25
Cincinnati	45	Edinburgh, Scotland	38
Detroit	83	Glasgow, "	50
Cleveland	40	Geneva, Switzerland	16
Jersey City	80	Montreal, Canada	55

At page 503, report of the Commissioners for 1887, the population of the District of Columbia is assumed to be 200,000. The capacity of the mains being 30,454,560 gallons per diem, the daily supply is 152 gallons per capita, more than double the supply of any European city named in the table above.

The daily consumption of water by the United States in the various public buildings is stated (report 1879, page 372) at 2,626,188 gallons, as ascertained by careful computation. Since this estimate was made the consumption of water by the United States has been somewhat increased at the new building for the Bureau of Printing and Engraving and by the ponds of the Fish Commission. The amount of water used by the United States may be assumed to be about 4,000,000 gallons per diem.

The only practical means to arrest the enormous waste of water is to resort to radical measures of restriction. At the same time the means resorted to must be such as will be entirely equitable to all parties concerned and will give the least amount of trouble to the people and to the authorities. While for some reasons it may be advisable to do away altogether with any tax for the use of the water, it is nevertheless necessary that the authorities shall control the use of the water within reasonable limits and not permit any waste whatever

In the report for the year 1887, at page 508, it is admitted that the present system of inspection by means of domiciliary visits can not afford anything more than a partial means of control.

If meters were placed in all houses or premises where the water is taken—a system to which the public is universally accustomed wherever gas is used—the state of the meter whenever inspected will indicate the amount of water which has passed through it. The meters should be owned by the District and the whole expense of the system paid by the water fund. To this there can be no objection, as no expense

will be devolved upon the owners of property, and no farther annoyance can occur to the tenant than is found in the inspection of gas meters.

The present system of water rents is necessarily unsatisfactory. When payment is to be made only for a certain amount of water actually furnished, the careful householder will have the benefit of such care in small payments. Each water-taker may be allowed to have as much as 100 gallons of water per diem free of cost, and have to pay only for the excess consumed over that amount.

As a restraint upon careless or extravagant consumers or wasters of water, a liberal maximum should be allowed to each in proportion to the reasonable needs of the premises, the existing penalties for non-compliance being strictly maintained.

An approximate estimate will show that a system of the kind will afford a revenue sufficient to establish and to maintain the same. If 10,000,000 gallons per diem be sufficient for the actual needs of the population, 100 gallons per diem being allowed free of charge to each of the 30,000 premises now supplied, in that case, 3,000,000 gallons per diem will be furnished free of cost, leaving 7,000,000 gallons per diem to be paid for. This amount, at the minimum charge of one cent per 100 gallons, will yield a revenue of $700 per day; the result being a gross revenue of some $250,000 per annum. A number of the premises classified as "miscellaneous" being used by the District Government, no revenue will accrue from such premises as are thus occupied.

For the year ending June 30, 1887, (report for 1887, page 476) the revenue from water rents is stated at $138,539.49. At page 487 of the report for the same year, 1887, the lowest rate of water rent charged for domestic purposes, is $3.50 per annum. In the majority of such premises the allowance of 100 gallons per diem will cover all the water used and the occupants will therefore have nothing to pay. It might also be advisable to place meters in all of the Public Buildings occupied by the United States, in order that a regular record of their readings may be kept for the purpose of affording reliable data which may be available for future use.

If the necessary money for purchasing meters and establishing such a system should not now be available, an advance for the purpose can be made from the Treasury of the United States, as has been done in several instances, to be repaid from the Water Fund, the charge for the use of the water being fixed within the maximum of three cents per 100 gallons now allowable, such charge being computed upon the actual needs of the water fund for all purposes required under the meter system, the re-imbursements to the Treasury of the United States being fixed upon such terms as will not be burdensome.

Very respectfully,

J. P. KLINGLE.

[P. O. Box 364, Washington City, D. C.]

LINNAEAN HILL,
December 20 1888

Hon. G. F. EDMUNDS,

DEAR SIR: I enclose two newspaper slips which you may care to glance over. Will you kindly return them by mail

Very sincerely yours

T. P. KLINGLE

The question of water waste.—Further facts and suggestions by Ex-Commissioner Phelps.

EDITOR OF THE EVENING STAR:

It is seemly in those who undertake to instruct the public first to inform themselves—to cure their own ignorance. This accomplished, it is advisable, in discussion, to adhere to facts, and to indulge in as little fancy work in delineation as possible. Nor is it wise to manifest a spirit of local jealousy, even when founded upon the most substantial basis. Your two correspondents of the 24th instant, in their papers upon the water question, wholly neglected these wholesome precautions. Mr. Clarke quotes a remark, attributed to me by a correspondent, which I had taken occasion to correct in a somewhat lengthy interview published in THE STAR of the 8th instant. Mr. "Capitol Hill" assumes the number of Potomac water consumers to be 180,000, a number considerably greater than the entire popula ion of the District of Columbia at the last census. Must we suppose C. H. ignorant of the large rural population included in the District census, as well as of the fact that many thousands of people in the cities do not use Potomac water? These references will serve as indications of the reliability of the data of those gentlemen, while their contemptible insinuations are unworthy of the *standpipe* if not of the men themselves. There can be no good resulting from a discussion of the water question not designed to direct public attention to the causes of

and a remedy for the distress felt upon the higher levels. My object in the present paper is to correct, so far as possible, those erroneous impressions derived from statements, doubtless often repeated, of the character made in the two communications referred to. As the greatest sufferers from the water famine the residents upon the higher levels of Capitol Hill have the deepest interest in ascertaining the sources of the evil and in the adoption of such means as may promise relief. I have not the slightest doubt that if the waste in private premises can be ended all sections of the city will enjoy a sufficient supply of water.

WATER TAKERS.

There are 20,608 premises supplied with Potomac water. These embrace residences, offices, places of business, stables and all other premises where the water is introduced, and may represent something over 100,000 consumers. In a comparison of our consumption with that of other cities, it is fair to assume its use here for general purposes to be in the same ratio to water takers as in other cities, excepting only the public buildings. But, on the other hand, the demand for water for use in machinery and for manufacturing purposes is small here as compared with other towns. In some of the larger public buildings the water is pumped and the consumption in that way unknown. It is not difficult to ascertain the quantity used in others, as it can be computed from the size of the supply pipes and the average flow in them. By such means Mr. Samo reached, within a close approximation, the quantity consumed to all the departments of the government. In such methods there is no element of that guesswork in which C. H. indulged himself. But he furnishes the means for his own refutation. He says sleeping people (that is, water takers) do not waste water, and, from certain stated data, derives the conclusion that all the waste is in the public buildings, and so great is it that of the entire quantity of water brought to the city, only 2,438,822 gallons are left for the use of all the other consumers. To say the least, he has brought it to a very fine point. It is clear that the floodgates in the public buildings are as widely open by day as by night. It is also certain that a large majority of the water takers have an ample supply which they use very freely *when not sleeping*, and while those flood gates are still wide open. The pumps for the high services yesterday lifted 3,107,168 gallons. Whence came the several hundred thousand gallons in excess of C. H.'s calculations? The water so pumped was consumed by 3,179 water takers. Where did the millions of gallons used and wasted in the remaining 17,480 places supplied with Potomac water come from? They are not attached to the high service and got no supply thence. If we assume that these outside, and, so to speak, unregenerated 17,480 w. t's used and wasted water in the same ratio as did those drawing from the high services, they must have—

	Gallons.
Consumed	17,085,000
Add the amount pumped	3,107,168
Also, Capt. Hoxie's estimated public use	7,000,000
Total amount supplied yesterday	27,192,168

C. H. states that on a certain day in a June month, when the actual flow from the reservoir was measured, it amounted to 25,740,816 gallons. The agreement between quantities so ascertained suffices to show how necessary it was that C. H. should have studied his subject before rushing into print.

WATER SUPPLY.

The supply is conducted to the city in five mains of the following diameters: One of 36 inches, two of 30 inches, one of 20 inches, and one of 12 inches. The flow through the larger pipes is much greater in proportion to size than through the smaller ones, because of the less proportionate friction. The total would be about equal to the united flow through 40-12-inch pipes laid in the same situation. Of these 11 would furnish ratably the government quota. The equivalent of 29-12-inch mains remain to supply the water-takers. Of these 2,529, out of a total of 20,608, draw their supply from the Washington high service, which is supplied by *one 12-inch pipe and one 6-inch pipe*, this last being connected with the other high service. That is to say, one-eighth of the water-takers are supplied through one-nineteenth of the capacity of the mains supplying all the water-takers. The remaining 18,000 water-takers are supplied with an average equivalent of a 12-inch main to each 1,000 of their number. It cannot, therefore, be said that the high services are supplied to the detriment of any section of the city.

THE LATE IMPROVED SUPPLY.

The higher houses attached to the standpipe, for some days past, have been much better supplied than formerly, but the water still runs intermittently on the chamber floors. This improvement is due largely to the fines imposed recently upon those

of the higher-service takers who had the five hundred unclosed and unclosable openings in their pipes, to which I referred in a former paper. Those five hundred open pipes were the discovered places of wicked waste. There are still more to be discovered and closed, for nearly *one thousand gallons* of water was supplied yesterday to each of the premises attached to that service. About this supply to private premises there is no mistake. The amount of pumping done and the number of places furnished are known, and *no government departments* drew from that source. It must be remembered, too, that some of the premises were insufficiently supplied, when their fair share would have been one thousand gallons to each one. An intermittent flow leads to waste. Water takers leave faucets open and collect water when it may flow during the night. Tubs are filled and overflow, perhaps, for hours and while the owner still sleeps. People will hardly lie awake or turn out at early hours in order to close such openings. An acquaintance has a sick wife whose nervous condition made intolerable the gurgle of an eternal flow through a neighbor's w. c. pipe, located against the party wall between the two houses. Remonstrance in that case proved of no avail. It is, however, consoling to reflect that his meanness will be punished by costs in doctors' bills due to the open communication between the soil pipe and his rooms. A plumber, called to a first-class residence recently erected in the west end, to find out why it was that water would not run properly on the chamber floor, immediately closed two openings in the basement when the difficulty was overcome. Waste of such character, as well as from defective and neglected plumbing, is what the Capitol Hill people need to bring to an end. That done there will be no difficulty about water. An imperfectly filled 12-inch pipe, and a 6-inch pipe, give a generous supply, if not wasted, to 2,529 premises relying upon the high service. How certain then that 1,000 places will be well supplied through the equivalent of a 12-inch pipe when worse than needless waste is arrested.

STANDPIPE SERVICE.

When erected the standpipe was expected to serve 2,000 or more premises. The idea then prevalent, as now, was that the great waste was in the departments, and, with this in view, great expectations were indulged in. But the delusion was short lived. The water pumped and the places served were both known, and while the supply was excessive it was found to be insufficient. Waste then arose elsewhere than in public buildings. It was of no avail to connect other localities with a supply already overtaxed. The northwest section has rapidly improved and the number of premises now supplied from the high service is greater than was originally anticipated had both the northwest section and Capitol Hill high levels then been attached to it. The houses on the average in the northwest section are larger than elsewhere and hence a greater proportionate water tax to population is paid. In 2,529 premises some five hundred openings were found in the water pipes. The same ratio of waste by other water-takers would give, for the number of such openings throughout the cities, no less than 4,000. Close these and water will rise at once in the pipes on Capitol Hill. This is the problem before the people living there, and it is shameful to pretend there is any other.

REDUCERS.

With all the care and watchfulness the water department can give there will still be enormous waste. People are often so constituted as to feel a mean satisfaction in the deprivation and inconvenience they may cause to others. Then there are the indifferent takers, the careless, heedless, down-at-the-heel class, who belong to C. H.'s order of innocent sleepers, who waste not; neither do they wash. Their sleep is the sleep, in liquid metaphor, that knows no waking. Let us take comfort that none of them will ever be mustered with those who sleep the sleep of the just. For these classes, in addition to surveillance, is needed the absolute removal of power to waste so far as is consistent with a sufficient supply of water. To this class on the lower levels the quantity of water delivered in a given time should be reduced in all premises there to the smallest effective minimum flow. This would reduce the power to waste and improve the pressure in the mains. It can be effected by partially turning the outside cocks, as I explained in a former paper, but reducers will do the business more reliably, and to this we must come before the new works will be in operation. Considerable outlay by the water department has been made to improve the flow in the pipes conducting water to Capitol Hill. Engineers now see no room in practicable ways for the further improvement in that direction, so that we come back to the general proposition that what is needed is to confine the use of water to the actual necessity of the community supplied and to cut off the ability and power over the supply now in the hands, especially of those on the low grounds. A small opening in a low level runs off more water in a given time than a large one on the elevated land. But waste belongs to all levels, from the highest to the lowest, while it is only those on the high levels who suffer by reason of it. Their interests, therefore, should unite them in efforts to abate the evil.

S. L. P.

"Plumber" Again on Water Waste.

To the EDITOR OF THE EVENING STAR:

In THE STAR of last Saturday there appeared a communication from "Capitol Hill" upon the water question and in criticism of a previous article signed Plumber. Capitol Hill should remember that abuse and vituperation are not usually considered good arguments, and to wilfully misquote the language of a writer whom he is abusing does not look well for the owner of six ten thousand dollar houses. Plumber did not make the statement that "75 per cent of all the supply is wantonly wasted through defective water closets," as Capitol Hill misquoted, but Plumber put it this way: "It is our *opinion* that 75 per cent of all the supply is wantonly wasted, and of this 75 per cent is wasted through defective water closets." Now 75 per cent of 75 per cent is 9-16 of the whole, and we are of the same opinion still. Capitol Hill knows that *average* houses do *not* cost ten thousand dollars each, and that the average citizen does not live in a ten thousand dollar house with all the water pipes protected from the frost. The average house is one in which, in cold weather, the water pipes will freeze unless the water is withdrawn or permitted to run to waste. Yet it is not so much the fear of *freezing* that causes the waste, as that goes on without interruption through the dog days as well. Now we are not surprised that the owner of so many valuable houses, which may possibly be situated on Capitol Hill and haven't seen a drop of water on the first chamber floors since they were built, should feel very sensitive about this water question. Pumping water by hand or taking it up stairs in buckets is not conducive to amiability of disposition. Yet he should not abuse those, who, in friendly spirit, are trying to have this wicked waste prevented, chiefly for the benefit of Capitol Hill. If "Capitol Hill" will lend his energetic pen for the suppression of waste of Potomac water in private dwellings, instead of abusing his friends, he may be able to take a bath next summer without pumping. "Capitol Hill" says, of his six $10,000 houses, "that in not one of them is there or ever has there been a *drop* of water wasted, either by the closets, *open faucets* or leaky pipes." If his houses are situated somewhere in the country and the water service is by hand buckets, his statement is reasonable. If, however, the houses are connected with Potomac water under pressure, he should have signed himself "Ananias *and* Sapphira," after such a statement. Plumber did not say that we have 150 gallons per capita, as "Capitol Hill" quoted him, but Plumber did say we have *about* 150 gallons per capita. "Capitol Hill" takes the volume in gallons reported by Col. Casey as the flow of the conduit for one day, and divides it by 180,000, with the result 143 gallons; now this shows our statement sufficiently accurate. Yet if "Capitol Hill" had used as a divisor a number representing only the population of the city he would have shown a larger per capita use, or waste. We do not see why he did not include the population of the adjacent counties of Maryland. When Col. Casey measured the flow in June the river was low and the conduit was not running its full average—and it is sufficiently accurate to estimate that we have 150 gallons per capita. "Capitol Hill" says there has been loose talk about the largest water supply in the world, etc. We do not know what loose people he has been talking with, but it looked to us like an excuse for his dragging in the Roman empire—it sounds so well, you know, to add a bit of ancient history. We do not own six ten-thousand-dollar houses, but we do know somewhat about this waste of water, and we know many instances of defective water closets in the yard or basement, which for years had prevented a flow of water to the upper stories, and recently, upon complaint by the owner of a large house, that no water had flowed to the second story since he had occupied it, we found defective fittings on lower floors, through which thousands of gallons were running to waste every day; the defects being remedied, there was an abundant supply on second floor, and similar cases are the frequent experience of plumbers. Yet we cannot venture a modest opinion without slandering and libeling the citizens with our nonsense, as "Capitol Hill" substantially puts it. For the vials of wrath sent by "Capitol Hill," we hope to give him full measures of water by preventing domestic waste thereof, and leave the larger theme of the new conduit or tunnel with the engineers, who know more about such things than either "Capitol Hill" or A PLUMBER.

Slops and water.

For some time past an ex-commissioner of the District has been airing his ideas on the subject of the water supply. To these vagaries it was expected that a listening world should give heed, and with bated breath. Some irreverent individuals, however, will not be imposed upon by the nonsense of the ex-commissioner, who savagely turns upon them, and, in an evening paper of March 3d, poured out his wrath upon

his critics. It seems to be an offense to this splendid mortal that honest men with a substantial grievance should presume to complain and fail to accept his condescending utterances. But as he deigns to furnish alleged facts and imaginary computations, his assertions may be examined and compared with actual data. At page 82, report of 1876, the water supply is given as follows:

36-inch main, daily supply	17,935,200
30 " " " "	11,368,800
12 " " " "	1,150,560
Total capacity per diem, gallons	30,454,560

We are now informed by the ex-commissioner that we have five mains, whose aggregate capacity is equal to forty twelve-inch mains. In the above table the twelve-inch main has a capacity to deliver 1,150,560 gallons per diem. The total capacity of the mains, according to the ex-commissioner, must be 1,150,560×40=46,022,400 gallons per diem, or 51 per cent. more than the actual capacity (30,454,560) of the mains.

Having put his foot into it, the ex-commissioner flounders along after another will-o'-the-wisp. He says that Mr. Samo made an actual measurement of the water consumed by the United States. He does not give the figures from Mr. Samo, but says that Captain Hoxie *estimates* the amount at 7,000,000 gallons per diem. It was a saying of the great Disræli that "It is not logic, but rhetoric which rules the world." As the ex-commissioner has been one of the rulers of the world, the rules of logic, the "suppressio veri" and the "suggestio falsi" do not apply. As a mere matter of curiosity it may be interesting to know the measurement of Mr. Samo, in which the ex-commissioner says there "is no element of guess work."

At page 372, report for 1879, the measurement of Mr. Samo is given at 2,626,188 gallons. The estimate of Captain Hoxie is 7,000,000 gallons per diem as the amount of water used by the United States as against the *measurement* by Mr. Samo of 2,626,188 gallons, a difference of 166 per cent.

But the rhetoric of the ex-commissioner, once astride of his rule, plays him even more fantastic tricks. He says that the water used by the United States is represented by eleven twelve-inch mains. The twelve-inch main, supplying 1,150,560 gallons, we have 1,150,560×11=12,656,160 gallons, or 80 per cent. more than Captain Hoxie's *estimate*, and 381 per cent. in excess of the *measurement* made by Mr. Samo, in which there "is no element of guess work." The correctness of the result obtained by Mr. Samo is evident from a very simple computation. The public buildings, fountains, &c., are supplied through pipes which vary from one inch to ten inches in diameter. As circles vary as the squares of their diameter, and as we know the capacity of a twelve-inch pipe to be 1,150,560 gallons, and as the aggregate of the squares of the diameter of the pipes supplying these buildings, &c., is 756, we have the following proportion: 144 : 1,150,560 :: 756 : 6,040,440. By another method 756÷144=5¼. The aggregate of the pipes supplying water to the United States is equivalent to five and a quarter twelve-inch mains, and, if running continuously day and night will consume 6,040,440 gallons of water. The Departments are open during seven hours on week days, and closed on Sundays and holidays, while the workshops are open for ten hours on week days. Allowing an average of twelve hours a day will give an approximate consumption of 3,020,220 gallons per diem, which shows the accuracy of the measurement made by Mr. Samo—2,626,188 gallons per diem.

Not content with these marvellous flights into the domain of fancy, the ex-commissioner mounts his noble stand-pipe and bids defiance to all below. As the late H. Greeley used to say, the history of this noble stand-pipe is "mighty interesting reading." At page 261, report for 1878, we are told that it was intended to be used for supplying Capitol Hill. But the pipe connecting with the stand-pipe stopped about two miles from the Capitol, and never got any farther east than Iowa Circle, at the intersection of Thirteenth and P street northwest. As Mr. Sam Weller would say, "a werry heggstrahordinary cohincidence." This singular proceeding was followed by another. A main was laid down Four-and-a-Half street as far as the Avenue. The money spent in this manner had been appropriated to supply water to Capitol Hill. It also happens that the critics who have stirred the bile of the ex-commissioner are residents of Capitol Hill, and have no rights which either Iowa or Iowa Circle should be bound to respect. Why should these croaking caitiffs disturb the sweet serenity of the ex-commissioner?"

> He called them untaught knaves, unmannerly,
> To bring a slovenly unhandsome corse
> Betwixt the wind and his nobility.

These fellows are a perverse set. Not content with snubs and insults from official understrappers and congressional committees, they must also brave the scorn of the ex-commissioner by harping upon unpleasant and unsavory subjects. Why his stand-

pipe is the very apple of his eye. Suppose that Iowa Circle were on Capitol Hill? And on the other hand, suppose Capitol Hill were at Iowa Circle!

Before ye gie poor, frailty names,
Suppose a change of cases.

Let us suppose that the ex-commissioner had built houses, as some people have done, on Capitol Hill, and has been paying water taxes and water rates and no water furnished, is it not possible that after years of bamboozling and lies and insults, he might perhaps venture to dare to think that there may after all be something, as it were, rotten in the state of the body corporate, or elsewhere?

But these fellows, nevertheless, are unreasonable. They do not possess his superior misinformation. They say things that rouse his indignation. They pooh-pooh his "reducers." They have no "reducers" to sell, nor do they want to buy any "reducers" at the point of the bayonet, as the ex-commissioner seems to think somebody ought to be made to do. At all events, they must be rebuked, and the ex-commissioner sheds his ink in torrents of scorn upon their unmannerly heads. They are not behind the scenes, as has been the privilege of the ex-commissioner, and must take the slop he offers as the substitute for a purer element.

The anomaly exists that while in some sections of the city there is a pressure of thirty pounds to the square inch, in others there is not more than three pounds. It is also noticeable that whenever a complaint is made of an insufficient supply in any Department, the complaint is always remedied within twenty-four hours. It is also noticeable that when fires occur the water office is always as busy as the devil in a gale of wind. Where the water comes from no one knows, but, nevertheless, there it is.

There are 26,000,000 gallons delivered daily to 20,475 water takers, allowing 3,000,000 per diem to the United States, which is an average of 224 gallons to each person, and 1,143 gallons to each house. There is no reason why, in one part of the city, a single house shall be able to waste 10,000 gallons per diem, while in another locality it is not possible to draw twenty-five gallons. The reports of the commissioners to which the references herein are made teem with the subject of insufficient supply, for which statement there is not the least foundation in truth. If the supply were quadrupled, the inequality in distribution being as it is now, the deficiency will be the same.

If it be a source of amusement to the ex-commissioner to break into a cast-iron perspiration because the people on Capitol Hill do not care to take his lucubrations as gospel truth, let him ease his troubled spirit in his own way. Artemas Ward professed to have a great admiration for the immortal Washington. "George," he said, "was a great man. George never slopped over." The ex-commissioner "slops over." Even his stand-pipe can not hold him in.

J. P. KLINGLE.

[Committee No. 191.]

Letter of the Secretary of War.

WAR DEPARTMENT,
Washington City, January 2, 1889.

Hon. GEORGE F. EDMUNDS,
Chairman Joint Committee on Investigation of Washington Aqueduct,
U. S. Senate.

SIR: In accordance with your request of the 19th ult., I have the honor to transmit a letter-press copy of the proceedings—incomplete—of the Court of Inquiry appointed to investigate the lining of the tunnel extension of the Washington Aqueduct.

Very respectfully, your obedient servant,

WILLIAM C. ENDICOTT,
Secretary of War.

[Committee No. 192.]

Capt. R. L. Hoxie's statement, submitted Dec. 20, 1888.

The plan and estimates submitted to Congress and which seem to have been made the basis of appropriation in the "Act to increase the water supply of the City of Washington, and for other purposes," approved July 15th, 1882, will be found in a letter from the Commissioners of the District of Columbia to the Chairman of the Committee on the District of Columbia, which was printed as Senate Mis. Doc. No. 76, 45th Cong. 3d Sess. (see exhibit A). Major Wm. J. Twining, Corps of Engineers was the Engineer Commissioner and this plan originated in his office. It is known as the Twining plan.

Other plans had the attention of Congress at the same time. The leading features of these will be found described and discussed in the Annual Report of the Commissioners of the District of Columbia for the year ending June 30, 1879, pp. 359 to 381, which was printed as H. R. Ex. Doc. I, part 6, 46th Congress, 2d Sess. (see exhibit B). They are further discussed in a Report from the Committee on the District of Columbia submitted Dec. 8, 1879, and printed as Senate Report No. 39, 46th Congress, 2d Session (see exhibit C), and in a subsequent report from this Committee submitted March 9, 1882, and printed as Report No. 242, 47th Congress, 1st Session (see exhibit D).

It is inferred from the general tenor of the Committee Reports and from the exact accordance of the appropriations made with the estimates of the Commissioners of the District of Columbia as finally submitted, that the plan and estimates of the Commissioners were made the basis of appropriation in the Act of Congress under which this work has been prosecuted.

The essential features of this plan which are applicable to the Extension of the Washington Aqueduct are given by the following extracts from the Commissioners letter:—

"It is proposed to bring in this supply by means of a nine-foot conduit from the distributing reservoir to an available site for another reservoir east of Seventh street west, thence, for the present, by a four-foot cast-iron main along New Jersey avenue to the principal mains which now radiate from the vicinity of L and G streets to the parts of Washington and to Georgetown. The twelve-inch main along Boundary street is also to be connected with this new main.

"The accompanying plan and profile give the location of the conduit, reservoir, and four-foot main.

"The line of the conduit is carried close to the northern boundary of the city, and will be provided with outlets for tapping at intervals with other mains, as the future supply may require.

"In order to retain the services of the present distributing reservoir, the conduit is made to tap it at the bottom. The shortest practicable line is taken; and, to avoid land condemnation, this follows as much as possible existing streets and county roads.

"Rock Creek may be crossed either by a gang of large cast-iron mains laid as siphons through the bed of the creek, or by a tunnel through the compact rock which underlies this stream. If borings in this rock are satisfactory, the latter method is, I believe, the best and cheapest. The former has the advantage of requiring, for the present, only as many mains as are necessary to bring the requisite supply of water with provision for adding others when needed. It is, however, a perishable construction, while the former method is, for all practical purposes, eternal.

"The line is so located that the conduit rests throughout on the natural ground where not in tunnel, and is protected where covered by embankment by side walls computed to resist independently the entire water pressure."

The profile of the proposed line shows that some tunnel work would have been required as an incident of construction, and that upon other parts of the line tunneling might have been substituted with advantage for open cutting because of the depth of excavation. In this respect or in any other respect, the Aqueduct extension would not have differed in character from the 12 miles of Aqueduct already constructed between the Great Falls of the Potomac and the Distributing Reservoir. The Twining plan contemplated a similar surface conduit of brick masonry not differing essentially from all other structures of like character, having an uniform slope or fall from the Distributing Reservoir near Georgetown to the new Reservoir to be constructed east of 6th street N. W.

The suggestion was made in this plan, that the crossing of Rock Creek might be effected "by a tunnel in the compact rock which underlies this stream." That is to say, by a rock tunnel forced conduit under heavy internal pressure, an exceptional structure such as was afterwards proposed for the whole four miles of Aqueduct extension. The adoption of such a structure only, for crossing Rock Creek in the compact rock underlying that stream, was expressly conditioned in the Twining plan upon the stipulation "if borings in this rock are satisfactory." Upon no other terms was it suggested or contemplated.

Major Twining died on May 5th, 1882, about two months before the approval of the Act appropriating funds for the prosecution of this work, and substantially endorsing his plan and estimates.

The plan and estimates under which the work was inaugurated, will be found in Appendix Q. Q. of the Annual report of the Chief of Engineers for 1883. Report of Major G. J. Lydecker, Corps of Engineers, for the fiscal year ending June 30th, 1883. Increasing the water supply of the city of Washington; as follows:

"I was assigned to the charge of this work by Special Orders 186, paragraph 2, Adjutant-General's Office, Washington, D. C., August 11, 1882, and immediately entered upon such preliminary examinations and surveys as were necessary for prepar-

ing a project for the work. My first project was submitted October 5, 1882, as follows:

"I have the honor to submit the following project for carrying into effect the requirements of the act to increase the water supply of the city of Washington and for other purposes, approved July 15, 1882.

"The first section directs that certain surveys be made, and specifies the manner in which title to lands required for the purposes of the act shall be obtained; in this connection it is provided, as a preliminary to active operations, that the 'Secretary of War shall cause to be made a survey and map of the land necessary to extend the Washington Aqueduct from its present eastern terminus to the high ground north of Washington, near Sixth street extended.

* * * * * * *

"The second section of this act directs the execution of several items of work, and the third appropriates for the same, as follows:

"First. Extension of the Washington Aqueduct from its present eastern terminus to the high ground north of Washington, near Sixth street extended. Appropriation, $599,534.55, and for land for extension, $51,370.

* * * * * * *

"For the immediate requirements of this project the first item is the important one, and its consideration has been the subject of the most careful study; believing, however, that a detailed statement on this point would extend the report unnecessarily, I simply submit for the present that the construction of a tunnel from the distributing reservoir to that proposed on the heights near Sixth street extended will accomplish the desired object in the best and most substantial manner, at the least cost, and in the shortest time practicable. There is no reasonable doubt that this tunnel can be carried through solid rock in a direct line between the terminal points, and under these circumstances, with the perfected machinery of the present day, its construction would become a simple piece of engineering work. The cost and rate of progress would depend almost entirely on the character of machinery in use and on the degree of intelligence with which the work is directed. Based on the known cost of completed work of like character, $8 per cubic yard for the excavation would be an outside estimate; it would, in all probability, cost less. The length of tunnel will be about 21,400 feet, requiring a total excavation, including shafts, of about 66,250 cubic yards; estimated at $8 per cubic yard, the total cost of excavation of about $530,000, leaving a balance of the amount appropriated of $70,000 available for contingencies, such, for instance, as lining for tunnel wherever it might be found necessary.

"If the tunnel can be driven in solid rock (and every indication favors this assumption), it is apparent that we can rely with certainty upon a continuous progress of the work of construction, regardless of season or weather upon its permanence, without expenditure for repairs, and upon its easy subsequent enlargement at small expense.

"The only alternative to a tunnel would be a surface conduit, which would offer none of the advantages referred to above, while the natural features would require a very considerable increase in its length, in order to avoid excessive excavations and complicated engineering difficulties, such as would follow its construction on a direct line. Besides, the surface conduit would demand the appropriation of a continuous strip of land, which would not be the case if the work is made entirely in tunnel, and it is very doubtful if the land could be acquired with the sum allotted for that purpose.

"With these views, I have no hesitation in recommending the adoption of the tunnel system, leaving minor details to be determined upon after obtaining the conclusive data that will be supplied in sinking the initial shaft at the site of the new reservoir; if compact, solid rock is not reached within a reasonable limit, the project can be modified before arriving at any expenditure approximating that which would have been required for a series of preliminary borings sufficient to warrant a positive solution of the question."

It will be observed that the possible modification of the project was to depend upon the result of sinking the initial shaft at the site of the new reservoir. This was to be the "experimentum crucis." The reason for this is given in Major Lydecker's final project, but the context here is not quite clear without explanation, because it is not at first obvious that a single shaft at one extremity of a line four miles long can be the equivalent of a series of borings at intervals along the line. Such an assumption necessarily implies the further assumption that the surface indications and the evidence of existing excavations was sufficient to justify the belief that sound rock generally would be found at a reasonable depth below the surface of bed rock. The sole difficulty anticipated was the penetration of soft material, clay, sand gravel and bowlders with quick sand overlying the bed rock east of Rock Creek. The depth of this soft material was unknown. It was thought that the difficulty of shaft sinking

through such material might be fatal to the project if bed rock lay too far below the surface. Such an impediment has often been fatal to subterranean projects heretofore. Borings in such material have been considered unreliable. (Drinker, Page 240.) Bowlders may be mistaken for bed rock. Shaft sinking to bed rock gives the most satisfactory information, and the depth to bed rock was believed to be greatest at the eastern extremity of the line. Accordingly, the working shaft at the eastern extremity of the line was to be first put down to bed rock as a trial shaft, and if compact solid rock were found there, the other shafts were to follow. It would still remain to explore the rock thoroughly throughout the whole line before deciding upon the depth at which the tunnel must be driven, but the eight shafts at nearly equi-distant points gave an opportunity for doing this as a part of the work on the tunnel. The shafts after being all sunk to bed rock could be continued as shafts into the rock or boring could commence from the bottom of each shaft from any depth after reaching bed rock. If then found to be advisable intermediate borings and drifts in the rock could be tried. It must be assumed that this exploration was contemplated else the project cannot be defended.

The project continues:—

"This work should be done by hired labor, and the purchase of materials in open market, as that is the only way in which its rapid and economical construction can be obtained. The character of the work is such that its details must, in a marked degree, be determined during its progress, and they cannot be intelligently specified before hand. The contingencies involved being matters of speculation, would advance a contract price to the highest probable figures, in this way forbidding to the work any possible gain due to the absence of suspected difficulties. The pressing demand for the immediate beginning of the work, and its accomplishment in the shortest possible period of time and in the most perfect manner, are opposed to delays necessary for advertisement and awards, attended by the risk of getting finally an inefficient or irresponsible contractor; the work is so extensive and will require so large an original outlay to supply the machinery required for its rapid prosecution, that it is doubtful if many among the competing bidders would possess the requisite capital, experience and energy."

* * * * * * *

The report continues:—

"This was forwarded to the honorable Secretary of War, with the following indorsement by the Chief of Engineers:

"In this project Major Lydecker explains what has been done in the way of surveys and examinations, and makes recommendations as to the order in which the various operations should be undertaken and the manner of carrying them out. The portion of the project which, however, now requires action is that relating to the new conduit forming the extension of the aqueduct from the present receiving reservoir to the new reservoir provided for in the act.

"This extension he recommends shall be by a tunnel running in a nearly straight line from the eastern end of the present aqueduct to the new reservoir, and passing under the bed of Rock Creek where the line crosses that stream. The reasons assigned by him for preferring the tunnel to a surface conduit seem to be satisfactory, provided further examinations sustain his present opinion that solid rock will be found generally along the line. He also recommends that this portion of the project be carried out by hired labor, and not by contract, giving strong reasons for the preference; yet I am not satisfied that the work should be done in this way. All the acts of Congress in relation to public works look to their execution by contract when practicable, and it is hoped that specifications may be so drawn as to clearly cover all the details of work and enable contractors to bid understandingly. It is not necessary, however, that this point be definitely decided now, and it may therefore be deferred till more definite information regarding the character of materials through which the tunnel is to pass has been secured.

"I therefore recommend that the project for extending the Washington Aqueduct by tunneling be provisionally approved, its final adoption to depend on further examinations confirming the present opinion that solid rock will be found generally along the proposed line; that Major Lydecker be authorized to sink one or more shafts for the purpose of ascertaining the character of the underlying materials, and that the question of the manner of executing the work on the tunnel, whether by hired labor or by contract, remain in abeyance for the present.

"A preliminary sketch, showing the proposed route of the aqueduct extension, with a longitudinal section along the same, is herewith."

This preliminary sketch was purely an ideal sketch as to the longitudinal section showing the tunnel in the rock. It was not a guess at the probable depth of the tunnel because it was accompanied by the unequivocal admission of absolute ignorance upon this point. It served only to illustrate the peculiar feature of the project—an inverted siphon tunnel in rock, subjected to great internal pressure from the water it carried.

The report continues:—

"The above recommendations having been approved, I was instructed by letter from the Chief of Engineers, dated October 20, 1882, as follows:

"'Your project of the 5th instant for carrying into effect the requirements of the act of July 15, 1882, "to increase the water supply of the city of Washington, and for other purposes," has been submitted to the Secretary of War, with letter of this office of the 12th instant, of which a copy is herewith inclosed, and returned with his approval of the recommendation of the Chief of Engineers in relation thereto. You will be governed accordingly.'

"In order to accomplish the purpose indicated above, the work of sinking a trial shaft at the easterly terminus of the proposed tunnel was commenced about the 1st of November, and examinations were made at many localities along the proposed line of tunnel in order to determine, approximately at least, the level of solid rock. These operations continued until the close of the fiscal year, the shaft in the mean time having been driven into rock at an elevation of 29 feet above tide. The results obtained are set forth in my final project, and accompanying report by Captain Hoxie, which were submitted under date of July 14, 1883, as follows:

"'Referring to the project for the extension of the Washington Aqueduct, submitted in my letter dated October 5, 1882, and to the action taken thereon—whereby it was "provisionally approved, its final adoption to depend on further examinations confirming the present opinion that solid rock will be found generally along the proposed line; that Major Lydecker be authorized to sink one or more shafts for the purpose of ascertaining the character of the underlying material, and that the question of the manner of executing the work, whether by hired labor or by contract, remain in abeyance for the present"—I have now the honor to report the completion of the proposed examinations, and to recommend the final adoption of that project, the examinations having satisfied the conditions expressed above. The trial shaft was started at the eastern terminus of the proposed conduit, in the grounds of the Howard University, for the reason that every condition indicated that bed rock would be at a lower elevation there than at any other part of the line, and that there also the maximum difficulties of sinking a shaft would be encountered; it was my desire to test the project where the conditions most unfavorable for its adoption were to be found.'"

This explains the proposition in his first project to obtain "conclusive data" by "sinking the initial shaft at the site of the new reservoir". The proposed examinations did not contemplate the exploration of the rock. This would not have been practicable by the means adopted—The sinking of a single shaft to bed rock at one extremity of the line—even had this been supplemented by boring from the bottom of this shaft. The term "solid rock" and "bed rock" are here synonymous. The sinking of this shaft determined nothing more than the depth to bed rock at the point where this depth was probably the greatest on the line, the character of the material through which the working shaft must pass to reach it, and the superficial appearance of bed rock at this point The examinations elsewhere along the line were restricted to surface indications, quarries and existing excavations, and served only to verify the data of his first project. No exploration of bed rock was undertaken.

The project continues:

"The shaft was commenced at an elevation of 145 feet above tide, and rock was reached at an elevation of 29 feet, giving 116 feet for its length. The intermediate material, commencing at the top and going down, was as follows:

"Fifteen feet yellow clay and sand, with water which was diverted by drainage trench.

"Forty-nine feet hard clay.

"Twenty-one feet sand, including about 4 inches in thickness of hard crust at bottom of this sand, consisting of sand and quartz pebbles, cemented with oxide of iron. This stratum contained nearly all the water encountered in sinking the shaft.

"Eight feet four inches of talcose clay resembling steatite, and consisting largely of silicate of magnesia, very hard and with 4 inches of crust at the bottom of this deposit, similar to that at the top.

"Ten feet sand, including 4 inches hard crust at bottom, similar to the other two, somewhat harder than either.

"Two feet mixed clay and sand with little water.

"Nine feet ten inches of very dark clay, mixed with sand containing fragments of carbonized wood, passing gradually into black sand which was cemented together sufficiently to maintain a vertical face under water, and contained rounded pebbles varying from 1 to 8 inches in largest dimensions.

"Ten inches of green sand, which rested directly upon bed rock.

"The maximum flow of water into the shaft was thirty gallons per minute. The clear horizontal section of the shaft at top is 6 feet by 6 feet, and at bottom 4 feet by 4 feet; it is timber lined throughout. For further information concerning the rock formation along the line, I would submit the inclosed copy of a report made to me by Captain Hoxie, under whose immediate directions the examinations and work of

shaft sinking were conducted. In addition to these results of our own examinations it is proper to add that they simply confirm the opinion deduced from the known geology of this region, that solid rock is to be found at comparatively small depths below the surface, and of engineers who have heretofore examined into the question of tunneling for the purpose of bringing the water supply to the high ground north of boundary. Thus in the first project for supplying the city with water, which was submitted by Lieut. Col. George B. Hughes, topographical engineer, in his report, dated January 15,1851, and which contemplated Rock Creek as a source of supply, "it is proposed to tunnel through Bodisco's Ridge, which is 50 feet above grade and 1,550 feet wide. The tunnel need not exceed 1,000 feet in length, but must be driven through *hard* rock. Again, General Meigs, in a letter dated January 24, 1879, addressed to the chairman Senate Committee District of Columbia, refers to an estimate which he made in 1876, for extending the Washington Aqueduct to the bluffs north of Washington, by tunneling, and states that the tunnel would pass through a formation similar to that in which the Baltimore water-supply tunnel is driven, *i. e.*, "generally hard, blue gneiss," and from information furnished by the resident engineer in charge of the construction of a section of the Baltimore tunnel, as to actual cost of that work, he estimates the cost of a tunnel conduit, 11 feet in diameter, for the Washington Aqueduct extension at $19.30 per linear foot.

"The further I examine into and study this question the more I am confirmed in the opinion that for facility, time, and cost of construction, security against damage from natural causes, or the violence of man, indeed in every material respect, the tunnel project is the best one.

"In my original project I recommended that the work of construction be done by hired labor, and the purchase of material in open market, for reasons stated and which led me to the conclusion that by such course only could the completion of the work in the best manner, shortest possible time, and at the least cost be counted upon with certainty. On the other hand, it is proper to observe that all the acts of Congress in relation to public works look to their execution by contract when practicable, and that for this reason, as well as other considerations of policy and convenience, it might be best to advertise for proposals to do the work by contract. From the fact that Congress in a great majority of its bills making appropriations for public works includes the requirement that they shall be done by contract, it might fairly be assumed that the absence of any such requirement from the bill under which this work is to be done indicates a doubt on the part of Congress as to the propriety of such restriction in this case, or at least that it was the intention to devolve the responsibility for a decision as to the manner of conducting the work upon the office responsible under the law for its execution. From all of the foregoing considerations, I conclude that it might be advisable, first, to advertise for proposals to do the work by contract, and to postpone final decision of this question until such proposals have been duly considered.

"The tracing transmitted with my letter of the 12th instant recommending condemnation of right of way for a tunnel shows its location on two alternate lines, and so far as the work is concerned it can make but little difference which is selected."

One of these lines followed the course which had been proposed for a surface conduit in the plan and estimates presented to Congress in 1879. The other was a straight line between terminal points.

I was assigned to the charge of the examinations required as a prelimary to the approval of Major Lydecker's project, with instructions from himself to sink one shaft, as a trial shaft, at the eastern extremity of the proposed tunnel line. The dimensions of this shaft were to be seven feet by seven feet at the surface of the ground. This was a departure from his first project which contemplated the sinking of the working shaft of full size at this point, to be used in driving the tunnel if the tunnel were decided upon. As explained to me by Major Lydecker he did not feel justified in incurring the expense of the full size working shaft under the circumstances. But for the misfortune of encountering quicksand, the change would not have been important. This circumstance, however made the contracted area of the shaft a source of danger, expense and delay, so that bed rock was not reached until early in July. Naturally, the public had generally concluded that no such rock existed, and the discovery was hailed as a great victory for the project.

The report continues:—

"The following is Captain Hoxie's report referred to above, dated July 7:

"I have the honor to submit herewith a detailed statement of the results of examinations for rock on the line of the tunnel proposed for aqueduct extension."

That is to say, bed rock; with characteristics as given specifically for each locality where it was found. The tracing referred to in my report as accompanying it locates with precision each point of observation.

This report continues:—

"It will be seen that the evidence of the existence of this rock, required as a condition precedent to the definite approval of your project, is conclusive. The data which can now be furnished to bidders for the tunnel work should have a very material effect upon the bidding if the work is to be advertised."

In this I referred to the anticipated difficulties of shaft sinking as explained further on. The trial shaft gave all necessary information upon this point.

This report continues:—

"Beginning at the distributing reservoir, the western extremity of the line, this rock, a compact tough gneiss, may be traced by its outcrop on the hillsides and in the transverse valleys to Georgetown. On the line of the canal road, just south of the proposed line of tunnel, a continuous section of the rock is exposed where it has been blasted away to form the road. Here the firm texture of the rock is shown, and similarly in the valley of Foundry Branch on the line of the tunnel.

"On the accompanying tracing of the general plan of aqueduct extension the points where the principal rock indications are found are indicated by small circles inclosing numerals. Of these, Nos. 19 to 25, both inclusive, refer to this section of the line.

"No. 19 is an outcrop of gneiss rock, 50 feet north of the proposed line.

"No. 20, same, 60 feet north.

"No. 21, working shaft in valley of Foundry Branch, in which valley this rock is exposed.

"No. 22, outcrop of gneiss rock.

"No. 23, same.

"No. 24, well 300 feet north of line on Mr. Weitzel's place, on which it is stated rock was found at 21 feet below surface of ground.

"No. 25, outcrop of gneiss rock in Dry Branch.

"Reaching Georgetown, it is observed that this ancient city is founded upon a rock. The only soil is the decomposed rock which passes gradually into the firm rock below. Bids for sewer work in Georgetown are always higher than in Washington, being predicated upon the certainty of meeting rock excavation.

"On the accompanying tracings two points are marked where wells have been sunk near the proposed line. No. 17 is a well in which, it is stated, hard rock was found at 10½ feet below the surface of the ground. No. 18 is a well in which, it is stated, hard rock was found 8 feet below the surface of the ground.

"Wherever the streets have been graded in Georgetown the banks at the side show the decomposed rock.

"The quarries opened in the valley of Rock Creek again show the firm texture of the sound gneiss rock, as well as the association of steatite. The latter is found in the so-called Indian quarry on the west side of Rock Creek.

"East of Rock Creek the bed rock lies at a lower elevation and has been covered with sand, gravel, and clay to a height equal to that of the exposed rock surface of Georgetown. This sedimentary deposit has been eroded into hills and valleys, and through it an occasional ledge crops out, as at Nineteenth street west, near the line of tunnel. It was this sedimentary deposit that had to be explored to ascertain the depth of the same to the bed rock on the line of the tunnel. It was presumed from surface indications that this depth increased gradually to the eastward, and for this reason the trial shaft was located upon the site of the permanent working shaft at the eastern extremity of the line. It was further evident that here the greatest difficulties would be encountered in sinking through water having sand and gravel. The working shafts at other points of the line will pass mainly through rock.

"The result of sinking the shaft has been to give in the most satisfactory way the character of the rock and its depth below the surface at the most easterly point of the line. It has also given a section of the overlying material and the exact measure of the water to be encountered in this material.

"The rock is here, at a depth of 116 feet, below the original surface, or 86 feet below the bottom of the new reservoir. The level of the latter is that at which excavated rock from the eastern section of the tunnel will be delivered through this shaft. This point is marked No. 1 on the tracing herewith.

"At a point on the proposed line of tunnel, about 1,500 feet west from this, a bore-hole was put down with a 4-inch auger and drills. At 58 feet depth below the surface a species of hard-pan, probably the same iron concretion found in the shaft, was encountered, 8 inches in thickness, then 5 feet of indurated clay containing some sand, then rocks drilling through steatite passing gradually into gneiss rock, the rock increasing in hardness with the depth. This point is marked No. 2 on the tracing herewith. The rock formation here is probably identical with that at No. 1.

"The remaining points where the principal indications are found are numbered from 3 to 16, both inclusive, on the tracing, and are as follows: No. 3, well on the so-called Stone property, 370 feet north of proposed line of tunnel, in which, it is stated, bed rock was found at 70 feet below the surface; No. 4, outcrop of quartz rock crossing the line; No. 5, outcrop of gneiss rock; No. 6, well 120 feet south of line, on Mrs. Stoddard's place, in which it is stated bed rock was found at 9½ feet below the surface of the ground; No. 7, well 140 feet north of line, on Mr. Truesdell's place, in which it is stated gneiss rock was found at 23 feet below surface of ground (specimen obtained);

No. 8, outcrop of gneiss rock 950 feet south of line; No. 8, quarry of same, 770 feet north; No. 10, outcrop of same, 500 feet south; No. 11, quarry of same, 2,370 feet south; No. 12, outcrop of same, 570 feet south; No. 13, outcrop of same, 590 feet south; No. 14, working shaft in valley of Rock Creek, in which valley rock is exposed on the hillsides; No. 15, quarry of gneiss rock, 920 feet north of line; No. 16, same, 870 north.

"To these may be added the well at Heurich's brewery, on Nineteenth street west, between M and N. This was sunk 30 feet to gneiss rock, 30 feet further to a small fissure which yielded 2¼ gallons of water per minute, and to a total depth of 975 feet without increase in the yield of water. The well, originally a bore-hole, was enlarged down to a depth of 60 feet from surface of ground, and I have inspected the gneiss rock obtained from this excavation and found it a compound sound rock."

The approval of the foregoing project of Major Lydecker was communicated to him by Department letter dated July 30th, 1883. Thereupon specifications were completed and the work advertised August 29th, 1883. The bids were opened October 5th, 1883, and the contract for the Aqueduct Extension was awarded to Beckwith and Quackenbush, who commenced the work of shaft sinking for the tunnel December 12, 1883.

The departure from the plan under which this work was inaugurated transpired after my official connection with the work had terminated. On January 4th, 1884, I found upon my table in the Aqueduct Office, the following order for which I was quite unprepared. The work was fairly launched, but a large amount of detail remained to be perfected. Ground had been broken at three of the shafts, but no considerable progress made—

"OFFICE OF THE WASHINGTON AQUEDUCT,
Washington, D. C., January 3rd, 1884.

Order: 1st Lieut'. Thomas W. Symons, Corps of Engineers, having by direction of the Secretary of War, reported to the undersigned for duty upon the Washington Aqueduct and the extention thereof, is hereby assigned as Superintending Engineer on the work, and as such will assume control of all active operations relating thereto.

He will be obeyed and respected accordingly and to that end all employes will report to and receive their instructions from him direct.

(Signed) G. J. Lydecker,
Major of Engineers, U. S. A"

Lieut' Symons took immediate possession of my desk at the Aqueduct Office, and my official connection with this work then terminated.

THE CRITICAL PERIOD OF THE WORK.

It was the critical period of the work when every step taken should have been directed to the proper determination of the depth at which the tunnel should be driven—that is the depth below the surface of bed rock at which sound rock would be found generally along the line. Upon this, depended, absolutely, the success or failure of the project—the expenditure of the sum estimated and already appropriated $599.534.55 for all of the advantages specified in the project, or the expenditure with few of these advantages, of a sum now appropriated amounting to $1.354.534.55, and whatever additional sum this work may yet cost.

On Sunday March 2nd, 1884, I discovered accidently that the tunnel had been started, immediately made a careful examination of the rock which had been thrown out and found it to be unsound. Major Lydecker's order assigning Lieut' Symons to duty on January 3d, 1884, excluded me from further participation in the work, left me in ignorance as to its progress and relieved me from all responsibility. Nevertheless, I warned Major Lydecker that the tunnel was not being started in sound rock and advised him to sink the shafts deeper. My advice was disregarded.

On August 16th, 1884, I left Washington for my present station in Montgomery, Ala. On August 11th, 1884, Major Lydecker stated in his annual report upon this work;—(See Appendix R R Report of the Chief of Engineers, 1884, pages 2305 and 2311)

"Our expectations as to the feasibility of the tunnel and the probability of carrying it in good rock have been more than realized.

* * * * * * *

"From present indications it may be fairly assumed that—excepting the deficiency before referred to in relation to the land for reservoir—the amounts already appropriated will serve to complete the several parts of the work of increasing the water supply; at least there is no reason at the present for asking any additional appropriation."

* * * * * * *

THE FIRST INVESTIGATION.

My attention was not again called to the character of the work done on this tunnel until March 18th, 1886, when I received from the Chief of Engineers a copy of Ex. Doc. 39—49th Cong. 1st, Sess. containing Major Lydeckers application for an additional appropriation, and showing that disaster had overtaken the work in consequence of driving the tunnel in unsound rock. He had been free to choose his own plan for the aqueduct extension, and had exercised this privilege without restraint. The act for increasing the water supply of the city of Washington and for other purposes, approved July 15th, 1882, contains no limitation upon the choice of a plan for the extension of the aqueduct. He had rejected the plan for a surface conduit which had been submitted to Congress with estimates, which were made the basis of appropriation. He had substituted therefor his own plan and his own estimates. He was, alone, responsible for the results This plain fact is somewhat obscured by the language of his annual report of 1885, as quoted in this Ex. Doc., so that another impression might possibly be conveyed—An impression that the deficiency was due to the plan and estimates which he had rejected. Under Major Twining, who is now dead, I was responsible for the plan and estimates which Major Lydecker had rejected. I wrote immediately to the Chief of Engineers protesting against such implication. I afterwards requested a hearing before the committee on appropriations, H. R. provided the same impression was conveyed to this committee by the document in question, and was accorded a hearing. The result of the investigation which ensued is printed in Report No. 3109, 49th Cong. 1st Sess.'

In this investigation I pointed out the abandonment of the plan presented to Congress, and the departure, in the work done after my official connection with it ceased, from the project of Major Lydecker, with which I had been associated. The annual reports of work done upon the Washington Aqueduct extension for 1884, et seq. show the following order of progress in the tunnel work:—

Name of Shaft.	Date of Commencement.	Date of Completion.	Date of starting East Heading.	Date of starting West Heading.	Character of rock in shaft.
West connecting shaft.	Feb. 12, '84	June 23, '84	June 23, '84	.....	Rotten gneiss increasing in hardness with the depth.
Foundry Branch shaft.	Dec. 12, '83	Feb. 16, '84	Feb. 16, '84	Feb. 16, '84	Gneiss rock partly rotten at top and seamy, becoming harder and more compact with the depth.
Fayette St. Air shaft.	Sept. 12, '84	Oct. 15, '84	.....	.....	Hard rock at tunnel grade.
Rock Creek shaft.	Dec. 13, '83	Jany. 29, '84	Jany. 29, '84	Jany. 29, '84	Gneiss rock hard and compact.
Widow's mite Air shaft.	Oct. 24, '84	Nov. 28, '84	.....	.....	Soft rock at tunnel grade.
Champlain Ave. shaft.	Dec. 13, '83	May 22, '84	May 22, '84	.....	Soft, seamy, talcose rock, which disintegrated on exposure, increasing however in hardness with depth.
13th Street Air shaft.	Dec. 10, '84	Dec. 16, '84	.....	.....	Soft rock at tunnel grade.
East shaft	Jany. 2, '84	July 17, '84	.....	July 18, '84	Soft rock growing harder for about 15 feet, after which, no change.

From this, it appears that headings were started independently from each shaft as soon as it reached what appeared to be sound rock, or a depth in decomposed rock which was thought sufficient. The air shafts followed at the leisure of the contractors. By this method of conducting the work, the opportunity for sounding the rock in advance of starting the tunnel, at 8 nearly equidistant points on the line, was neglected. By sinking all shafts simultaneously and carefully weighing the evidence of each, before starting the tunnel, information acquired after the tunnel was started would have been obtained in advance, and errors of judgement as to the character of the rock where the tunnel was started would have been corrected. This was the virtual abandonment of the vital feature of a project for a rock tunnel forced conduit. The great excess of the cost now contemplated by appropriations actually made over the estimated cost—an excess amounting at this date to $755,000—shows more clearly than argument the importance of reaching sound rock.

THE OBJECT OF THE WORK AS DEFINED BY THE SPECIFICATIONS OF THE TUNNEL CONTRACT.

The specifications for this work were prepared by myself under Major Lydecker's direction and were made a part of the contract with the successful bidder. They expressed my views of the object of the work and its proper conduct. His project presented an estimate of cost which assumed that a margin of $70,000, over the net cost of tunnel excavation in rock generally sound, was sufficient for all ordinary contingencies of the work, and for all lining that would probably be required. Such an assumption could only rest upon the premise that the tunnel must be driven below the general limit to which atmospheric disintergration had penetrated; so that sound rock generally throughout the line could be well assured. It was necessary to assume a theoretical depth for each shaft in order to estimate the approximate quantity of excavation in the shafts, upon which to invite bids. The actual depth of shafts would depend upon the depth to which the disintegration of the rock by atmospheric influences had penetrated. Of this, absolutely nothing was known, and the hypothetical depths were taken with little modification from the preliminary sketch which accompanied his first project. This sketch was an ideal section designed to show only the peculiar feature of the project—an inverted siphon under heavy pressure—and had been presented with the unequivocal admission of absolute ignorance as to the probable depth of the tunnel. The ultimate goal of all shafts was sound rock below the general limit of, even, incipient decay. This object had to be plainly stated in the contract and provision made for an indefinite excess of shaft excavation over the approximate quantities named in the contract. No increased rate must be permitted upon this increased quantity, and no increased rate for driving the tunnel at a greater depth. Accordingly, the contract reads as follow *lows:*—)

"Location of shafts—Four working shafts will be sunk simultaneously to such depth as may be required, the object being to penetrate the rock sufficiently to insure a continuous roof of sound rock for the tunnel." Then gives the approximate depths and in the concluding paragraph:—

"The following approximate estimates of quantities will be considered in computing the total of each bid as a basis of award; but no variation from these amounts arising from erroneous computations, or from changes made during the progress of the work, will be regarded as grounds for any claim against the United States it being distinctly understood that the contractor is to do all that is necessary to accomplish the object in view, (neither more nor less) as required by the United States Engineer." Then gives the approximate quantities.

The work surely had for its objective, sound rock else its commencement cannot be defended. If the objective was an imaginary line at a hypothetical fixed depth, then the specifications were drawn in vain, and the enterprise was puerile.

Necessity for exploration of the rock in advance of driving the tunnel.

It has been said that:—

"In no case was the tunnel started from the bottom of any one of the working shafts until reaching what we believed to be good, sound rock. At no place was there then apparent any reason for going a foot deeper." (See Remarks of Major Lydecker dated April 8th, 1886, printed with Report 3109—49th Cong. 1st Sess. Page 4.)

In the same report, (Page 46) occurs the following testimoney, taken May 6th—86:—

"Mr. WILSON. I suppose, of course, you have the depth of the rock at each shaft?

"Major LYDECKER. The record shows. We have that. I think it is shown in one of our tables. The essential point is that we went down into what we believed to have been first rate solid rock, suitable in every respect for the purpose.

"Mr. WILSON. And that you started the headings nowhere except in good rock?

"Major LYDECKER. Nowhere except in good rock.

"Mr. WILSON. I believe there are two connecting shafts; there are three working shafts and there are three air-shafts?

"Major LYDECKER. Yes, sir.

"Mr. WILSON. Were all of those shafts sunk before the tunneling began, or were the air-shafts sunk afterwards?

"Major LYDECKER. The air-shafts were sunk afterwards."

Major Lydecker's annual report upon this work dated August 11th, 1884, contains the following:—(See appendix R. R. Report of the Chief of Engineers 1884, page 2305)

"The West (inlet) shaft was sunk to a depth of 97 feet 1 inch; tunnel commenced June 23, and advanced to June 30 a distance of 13 feet. This part of the tunnel is in rotten rock, requiring timbering. It is gradually running into hard, solid rock."

I had given warning as to the character of the rock elsewhere in the headings, March 2, 1884, pronouncing it unsound, an opinion which was quickly confirmed. In the Congressional Report above referred to, (page 4). Remarks of Major Lydecker, he says:—

"Soon after, however, rock which had shown itself most refractory and hard to the

drill commenced to show signs of disintegration, and before long it was established that a considerable length of tunnel which had been *driven through what appeared to be perfectly suitable rock* would have to be lined, because of the effect produced on it after exposure to the atmosphere during periods varying from several weeks to months."

It appears that the statements of fact put in evidence must be accepted with some qualification and the conclusion is inevitable that the indications as to the character of the rock were not properly interpreted. Instead of starting the tunnel in rotten rock from the west shaft, the rotten rock here should have been probed to the bottom and the grade of the tunnel placed below it. Were a public building to be erected, the estimated cost of which was $600,000, stone for building it, which would prove to be unsuitable after a few months exposure to the air, would not be accepted, nor its use persisted in after the warning that it was unsound. Suitable tests would be applied to determine absolutely, the character of the stone to be used. Diligent search would be made for suitable building material. This tunnel is such a building. The plan which makes a deep tunnel of it and subjects it to great internal pressure, requires sound stone. Every effort should have been exhausted to find it, and failing, the plan should have been abandoned and a surface conduit constructed which would not have been subjected to such pressure.

THE EVIDENCE AS TO THE EXISTENCE OF SOUND ROCK GENERALLY, AT A REASONABLE DEPTH, LOWER DOWN.

It might be inferred from the testimony in the Congressional report above mentioned that no evidence existed that sound rock could be found generally along the line at a reasonable depth. There was no direct evidence on the line of the tunnel that the rock was better lower down. There was no direct evidence that it was not. There was no direct evidence at all, because the procuring of such evidence had been neglected.

Reasonable depth must be that depth at which the increased cost, due to the increased length of shafts for a tunnel which would be generally without lining, would not exceed the increased cost of driving and lining a tunnel which must be generally lined throughout. The deficiency up to this date, owing to tunneling in unsound rock, is $755,000. The cost of lowering the grade of the tunnel 150 feet would not have exceeded $60,000. There was the same presumptive evidence of sound rock at a reasonable depth that had been deemed sufficient to justify the commencement of a work which depended wholly upon finding such rock generally along the line, and there was the additional evidence of increasing hardness of the rock in each shaft as it descended. (See Appendix R R Report of the Chief of Engineers, Pages 2323 and 2324.)

The hardness of the rock increased to such an extent in descending and its general appearance improved so much that it was mistaken for sound rock. It was known that numerous quarries in this formation near the line of the tunnel, supplied unlimited quantities of the best quality of building stone. Sound compact rock, hard and dry had been shown to exist continuously down to the bottom of Heurich's well near the line of the tunnel—a thickness of 900 feet—all the water that entered the well being found within 60 feet of the surface of the ground. It was known that the tunnel was projected in a metamorphic rock which appeared to have been undisturbed since it was formed by heat or pressure; that whether heat or pressure or both had given to this rock its compact texture, the metamorphic action would probably be found more marked with increased depth—surface disintegration had been eating its way to better rock, and the sound rock found beneath decay would probably have a better texture than that of the original surface. It was known that the strata were nearly vertical and in a position most favorable to driving the proposed tunnel, presenting generally, an upturned face to a nearly direct penetration. The shafts of the tunnel—8 in all—were so located along the line, at nearly equi-distant intervals, that the sinking of these shafts to bed rock or lower would inaugurate the exploration of the rock, and at the same time utilize the work of exploration for the prosecution of the enterprise itself. This justified the commencement of the work upon strong presumptive evidence. Direct evidence was required to justify the selection of the tunnel grade. Direct evidence as to the nature of rock in the bowels of the earth does not spring to the surface unbidden. When much evidence is wanted, engineers interrogate the rock itself. The reply is prompt and sure and cheaply given. Eight questions with the diamond drill would have given answers at about every half mile, 50 feet deep below the tunnel grade adopted, at a cost of about $600. How searching would have been a cross-examination costing, say $5,000. Exposed to the air, the core brought up by the diamond drill would tell the effect of such exposure upon the rock from which it was cut. Trial shafts, drifts and borings penetrating to the proposed field

of work, properly interpreted, furnish the evidence of a subterranean conditions which is always relied upon in building any work of deep excavation, whether a tunnel or open cut or deep foundation. It is impossible to lay bare the whole area to direct investigation except by the final work itself. It is necessarily assumed that the borings, judiciously located, determine with all attainable precision the character of the material between them. In his exploration, the engineer examines the surface of bed rock, whenever he can reach it, not for projecting summits of sound rock where quarries of excellent building stone are found, but for the intervening pockets of decomposed rock—rock like that developed by the west shaft—beneath which he must drive his tunnel. Whenever he finds one of these ulcers, he probes it to the bottom: The diamond drill brings up in successive portions a continuous core of rock. It makes the exploration of each ulcer to a depth of not exceeding 1000 feet as simple and practicable as the exploration of a tub of butter. When he knows the greatest depth to which incipient decay has penetrated he knows how deep he must put his tunnel to insure sound rock, generally throughout the line. It must go below the level of this greatest depth. He may have missed some deeper pocket, which will be developed in driving the tunnel. This will then be an exceptional difficulty, not a prevailing characteristic. If the work is not too far advanced when a pocket is discovered it will be probed to the bottom and the grade of the tunnel again lowered so as to pass below it.

A FALLACY WHICH MIGHT OBSCURE THE EVIDENCE AS TO SOUND ROCK AT A REASONABLE DEPTH.

It might be inferred from the testimony in the Congressional report above referred to that the positive assurance of continuous sound rock between the borings was necessary to justify the work, or was assumed, by the engineer who rely upon these borings.

Such assurance is not possible. Borings which probe to the bottom all unsound rock that can be found over the proposed line give the assurance that the lowest depth so penetrated is below the general limit down to which the rock has been attacked by atmospheric influences. The natural conclusion from this is that sound rock will be found generally throughout the line which passes beneath this lowest depth, so found.

The specifications for this work require that the working shafts shall "be sunk simultaneously to such depth as may be required, the object being to penetrate the rock sufficiently to insure a continous roof of sound rock for the tunnel." The responsibility for properly determining this depth rests with the officer in charge of the work. The contract stipulation is satisfied when the contractor obeys orders.

AN EXAMPLE.

A recent example of the successful application of the foregoing principles in a formation similar to that underlying the District of Columbia, is found in the new Croton Aqueduct tunnel where it passes as an inverted siphon tunnel under the Harlem River. The Harlem River tunnel is about 450 feet below its hydraulic grade line: that is three times the depth of the Washington Aqueduct tunnel extension at its lowest point. The construction of the Harlem River tunnel shows the nature of the pockets of rotten rock in a gneiss formation and the ease with which they can be avoided by going down below the general limit of atmospheric disintegration. Mr. Fteley, the consulting Engineer, gives the following account of it:

* * * * * * *

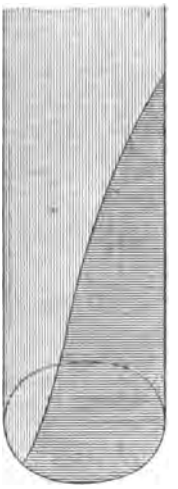
"I send by same mail a section of the Harlem River tunnel.

"We expected from the soundings a possible flaw in the formation and prepared our contract in such a way that we could, if necessary, abandon our first horizontal drift. H. H. and go deeper. This is what we were obliged to do. Very bad seams on A, B, bringing a large amount of sand and water, and a provoking mixture of hard rock and soft ground very difficult to handle, drove as much farther down. Borings showed a continuation of the seams as per A, B, C, D, and we went below them as shown; we are now at about point "T" in excellent dry rock and hope to go through in the same condition.

"All the excavation was at first in gneiss, but at a point between C, D, and T we struck marble and are now in it.

"The whole formation is a curious mixture of gneiss and marble interwoven together, and owing probably to the heat, produced at the geological age during which this ground was finally shaped, there is, in our deep excavation, no solution of continuity between the two rocks; a core taken out by the diamond drill showing as

per sketch such a perfect welding that it is almost impossible to say where the marble begins and where the gneiss ends."



The points referred to by Mr. Fteley are indicated upon the diagram herewith accompanying the account given in "Engineering News."

[Engineering News, February 18, 1888.]

THE HARLEM RIVER TUNNEL.

In bringing the water of the Croton River to New York by the New Croton Aqueduct the crossing of the Harlem River is made by a tunnel instead of an arched structure similiar to the High Bridge. The reasons for this radical change from the design of the original Croton Aqueduct are apparent in a greater security from accidental rupture and malicious mischief, considered in connection with the great calamity that might attend any interference with the public water supply of the present New York.

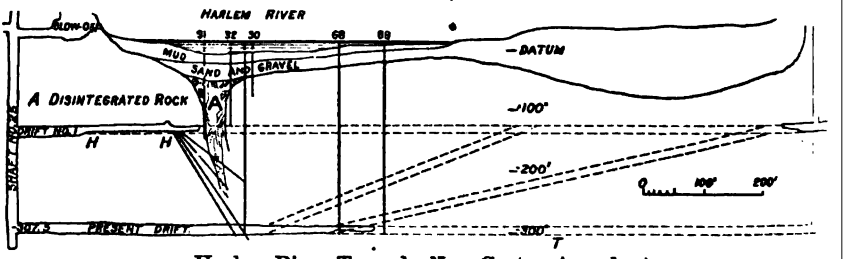
Careful preliminary borings with a diamond drill on either shore at first indicated that sound rock was to be found at a point 150 feet below the surface of the river. Shaft No. 25 was accordingly sunk to this point and a test heading (marked Drift No. 1 on the profile) was driven under the river for a distance of about 300 feet. At this point the character of the rock changed to a disintegrated and decomposed gneiss rock (marked A) which admitted considerable water into the heading and gave bad promise for the location of a tunnel which was to be submitted to a very heavy hydrostatic pressure. A halt was called at this point, and the ground ahead and beneath the drift was further investigated by test-holes made with the diamond drill, and in the direction and to the depths indicated by the heavy black lines on the profile, including the vertical holes from the surface of the river and one on the line of the drift omitted in our sketch.

The result of these borings showed a deep fissure under the bed of the Harlem River filled with this decomposed rock, but limited in its horizontal width and practically disappearing at a point about 250 feet below the river surface. Beyond and beneath this fissure sound gneiss rock was indicated, interstratified with thin quartz seams and white limestone.

To remove all question of doubt in the security of the tunnel under pressure and to avoid the necessity of lining the tunnel with metal, as originally contemplated, shaft No. 25 was sunk to the level of 307.5, about twice the original depth. Work on the new drift has now been pushed to the point indicated on the profile, and the rock penetrated has been hard and almost absolutely dry. The troublesome fissure has been passed, and the only point to be next considered was the connection of this lower drift with shaft No. 24, on the east bank of the Harlem River.

Motives of economy at first suggested a connection on of the two dotted ascending drifts. But when the danger of again meeting bad rock in this direction, and the troublesome nature of the working of an inclined drift were considered, the engi-

neers wisely recommended the continuation of the lower drift on its present direction, and the sinking of shaft 24 to meet it. The commission lately approved of this latter plan, and it is being carried out. It will cost more money if all things are equal; but the avoidance of a possible danger in meeting bad rock on a higher level is worth paying for; and any repetition of the experience on the west bank would very soon wipe out any margin of difference in the two schemes. The dip in the rock contour on the east shore of the river bears a suspicious resemblance to the one that has already caused trouble, and it is possible that a high level tunnel might find another fissure that had better be more economically passed on the present line. An inspection of profile, which is drawn to natural scale, will show that the general indications in the two pockets are very much alike, as far as possible trouble is concerned.



Harlem River Tunnel; New Croton Aqueduct.

AN EXAMPLE NEAR AT HAND.

The characteristics of a gneiss rock formation are shown in the 7 mile tunnel of the Baltimore water works, driven through a formation of gneiss rock similar to that which underlies the District of Columbia. The depth of this tunnel varies from 60 feet to 365 feet below the surface of the ground. The Engineer states that "where tunnel was near surface of the ground it had to be lined generally; though in cases I know where there was only 15 feet of covering, the rock was very solid and tunnel required no lining." A large proportion of this tunnel (4½ miles) has not been lined at all, because the engineer knew that lining was not required in the sound rock which lay far enough below the surface to have escaped the influences of atmospheric disintegration. A temporary failure of this tunnel to operate would be more inconvenient to Baltimore than a similar failure of the Washington tunnel, because the latter has parallel lines of water mains running to the city from the same sources of supply and these would continue to bring their supply of water; while Baltimore would be cut off from the source which supplies her tunnel aqueduct. Eight years of constant use have demonstrated the soundness of the rock at a reasonable depth and the soundness of Mr. Martin's judgment.

AN EXAMPLE FROM THE EARLY HISTORY OF TUNNELING IN THIS COUNTRY.

The Hoosac Railway tunnel was driven many years ago through Hoosac Mountain in a formation of Gneiss rock similar to that which underlies the District of Columbia. The grade of the railway fixed the grade of the Hoosac Tunnel. The summit of the mountain and its flank had been stripped of decomposed rock by glacial action. The west flank retained its decomposed covering.

"Dr. T. Sterry Hunt considers this decomposed mass to be the same rock as that of the mountain, and maintains that agencies, (glacial) which have swept off the decomposed surface from the entire upper portion of the mountain have spared the protected western flank. The whole surface of the mountain rock was, prior to the glacial period, decayed to a variable depth and swept off during that period, is a fact beyond a doubt". (Drinker, Page 232.)

The tunnel entering on the east side was driven without difficulty through rock which was generally sound and firm. The central shaft was sunk in this glacier-swept rock to a depth of 1028 feet.

"The shaft never was timbered to hold its sides in place, as the rock was sufficiently firm not to require it, being a dry mica-schist throughout." (Drinker, Page 600).

This was in rock below the general limit of atmospheric disintegration. But the grade of the railway compelled the tunnel to pass out on the west flank of the mountain through the superficial decomposed rock, and this was a source of great difficulty and expense. The consulting Engineer, Mr. Latrobe, says of this work:

"The 'demoralized rock' as it has been called, at the west end was indeed a troublesome feature, but not so bad as the quicksands and slippery clays of some of the

English tunnels. The water in the west shaft required only good pumps and ample power to keep it down. The central shaft has been dry and attended with no drawbacks, except those which casualties that might have been avoided with ordinary care have produced; and, lastly, the east end has been as straight forward and really comfortable a piece of underground work as could be wished for. The real difficulties of the enterprise have been due chiefly to other causes of an extraneous character, to which, as it is hoped that they are now no longer in action, it is not necessary to refer more particularly". (Drinker, Page 243).

[Committee No. 193.]

Letter of Secretary of War, inclosing estimate of Chief of Engineers for a line of surface conduit.

WAR DEPARTMENT,
Washington City, December 22, 1888.

SIR: I have the honor to acknowledge the receipt of your letter of the 22d ultimo requesting that an immediate preliminary survey and examination be made by the Engineer Department of a line of survey and flowing conduit, to take water from the present distributing reservoir around the north side of this city to the new reservoir near the Soldiers' Home, and an estimate be made of the expense of a conduit of that character, including all bridges, culverts, embankments, cuttings, masonry, and any other work necessary to put such a conduit in successful operation; also requesting to be informed of the length of time required to absolutely complete such a surface conduit.

In reply I have the honor to inclose a report of the 21st instant on the subject, from the Chief of Engineers, from which it will be seen that it was impracticable to make a preliminary survey, there being no funds available for this purpose. An estimate of $1,36.,128.18 is submitted.

The Chief of Engineers expresses the opinion that such a conduit as referred to in his report could be completed in two and a half years with ample means, assuming no delay by reason of land condemnation. He suggests that with more time for careful survey and study of the route a line might be obtained which could be built for less than the sum estimated.

Very respectfully,

WILLIAM C. ENDICOTT,
Secretary of War.

Hon. GEO. F. EDMUNDS,
Chairman Committee on Washington Aqueduct Tunnel, U. S. Senate.

[Committee No. 194.]

Chief of Engineers, December 21, 1888, *submits estimate for a line of surface and flowing conduit to take water from present distributing reservoir to new one.*

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., December 21, 1888

Hon. WILLIAM C. ENDICOTT,
Secretary of War.:

SIR: In compliance with the request contained in the letter of Nov. 27, 1888, from Hon. Geo. F. Edmunds, U. S. Senate, Chairman of the Joint Committee on Washington Aqueduct Tunnel, that "you will cause an immediate and preliminary survey and examination to be made through the Corps of Engineers of a line of surface and flowing conduit to take water from the present distributing reservoir around the north side of the city to the new reservoir near the Soldiers' Home and to cause an estimate to be made of the expense of a conduit, &c.," and also as to the length of time to complete such a conduit, I have the honor to submit the following:

A preliminary survey was impracticable, there being no funds available for this purpose.

The estimate, herewith, has been prepared under my direction by my assistant Capt. Clinton B. Sears, Corps of Engineers assisted as to prices of labor and material by Capt. T. W. Symons, Corps of Engineers, and Messrs. Bernard R. Green and Geo. H. Bailey, Civil Engineers, the latter three gentlemen having had wide experience on work of this character in this vicinity.

The estimate is based on the best available data at command, being a 20-foot contour map prepared in 1884 by the Engineer Commissioner of the District of Columbia and the information attained in building the present tunnel.

These data, however, are general only, and the value of the estimate must be judged accordingly.

It provides for a continuation of the old aqueduct of 9 feet interior diameter, of three rings of brick, from the distributing reservoir to the new reservoir.

Two lines have been studied. One shown on the tracing herewith, marked A, as continuous red line; the other is the red, blue, and red line; the red being common to both; the blue being the alternate portion. The former has been adopted as the one whereon the estimate is based, as it gives a more economical crossing of Rock Creek. It is 21,400 feet long.

Land damages have not been included in the estimate. The average surface width of land necessary is 70 feet.

A profile of the ground and the vertical longitudinal section of the conduit is shown on the tracing herewith marked B.

The bottom line of the conduit starts at the reference of 132 feet, which is 3 feet below the bottom of the distributing reservoir, and falls to the reference of 116 feet over the center of Rock Creek, and from there rises to the reference 128.83 feet at the new reservoir. The slopes in opposite directions to Rock Creek are with the object of quickly draining the conduit into the creek, should it become necessary.

With the distributing reservoir filled to the 146-foot level, the conduit will deliver into the new reservoir, at a level of 142.83 feet, 75,000,000 gallons in 24 hours.

With the water in the distributing reservoir fallen to the 139-foot level, the conduit will deliver 44,000,000 gallons in 24 hours. These discharges are calculated with Eytelwein's formula.

The rock profile shown on tracing B is hypothetical, except at the shaded portions where the position of the rock has been assumed the same as found in sinking the shafts of the present tunnel. Should more rock be encountered than is shown on tracing A, it would increase the excavation cost as estimated herein at $3.00 per cubic yard to $8.00 throughout the additional length of the rock. This may amount to as much as 15,000 cubic yards, or $75,000.

The methods of crossing Foundry Branch and Rock Creek are shown on tracing herewith marked C. The former is crossed by high embankments and a full semi-circular arched bridge of 50 feet span. The latter by a viaduct of masonry of eleven 50-foot spans supported on piers of stone masonry.

Except in tunnel the conduit is covered with an earth embankment to resist internal pressure and to prevent freezing. It is also further strengthened in embankment internally by bands of galvanized sheet iron 0.083 inch thick round the interior ring and embedded in cement mortar to preserve from corrosion.

Three 48-inch stop cock connections with masonry chambers, are provided, one near Rock Creek, one at Champlain Avenue, and one at 9th Street, so that the conduit can be tapped at these points by distributing mains, should it become necessary. At Rock Creek a 36-inch gate and waste pipe are provided for emptying the conduit in a few hours.

ESTIMATE.

21,387	cubic yards brick masonry in conduit through tunnel @ $14.00	$299,418.00
5,346	cubic yards brick masonry in conduit through open cut @ $9.00	48,114.00
67,541	square yards of interior lining of cement mortar ½ inch thick @ 30c. sq. yd	20,262.30
17,067	cubic yards rock excavation in tunnel @ $8.00	136,536.00
5,480	" " back filling rubble masonry @ $5.00	27,400.00
88,316	" " earth excavation in tunnel @ $3.00	264,948.00
40,789	" " " back filling tamped @ $1.00	40,789.00
800	" " " excavation in shafts @ $1,50	1,200.00
31,000	feet B. M. timber in shafts @ $35.00	1,085.00
37,942	cubic yards of earth excavation in open cut @ 40 c	15,176.80
77,885	cubic yards of earth embankment @ 30 c	23,365.50
7,269	" " dry rubble core wall in embankment @ $3.00	21,807.00

Foundry Branch Bridge.

46	cubic yards cut stone voussoirs @ $40.00	$1,840.00
115	" " brick masonry in arch @ 12.00	1,380.00
906	" " coursed rubble in spandrels, parapet and wing walls @ $800	7,248.00
241	cubic yards rubble masonry in foundation @ $5.00	1,205.00
130	" " earth filling over arch @ 50 c	65.00
121	" " dry rubble " " " $3.00	363.00

1,171 square yards of paving under bridge @ 60 c	$702.60	
348 linear feet of coping @ $1.50	522.00	
285 cubic yards excavation for foundation @ 75 c	213.75	
		$13,539.35
25 feet culvert at College Branch		5,513.10
12½ " " east of Rock Creek		3,384.84
3950 linear feet of open paved drain @ 30 c		1,185.00
1271 cubic yards of excavation for trenches @ 15 c		190.65
Galvanized iron sheathing No. 14 B. G. 126,000 lbs. @ 8 c		10,080.00
3 48-inch stop-cock connections in masonry chambers @ $4,000.00		12,000.00

Rock Creek Viaduct.

6,807 cubic yards of stone masonry in piers @ $10.00	$68,070.00	
838 cubic yards rubble masonry in foundation @ $5.00	4,190.00	
506 cubic yards voussoirs @ $40.00	20,240.00	
3939 " " coursed rubble in spandrels, parapets and wing walls @ $8.00	31,512.00	
1265 cubic yards brick masonry in arches @ $12.00	15,180.00	
283 cubic yards rubble masonry in wing walls @ $4.50	1,273.50	
2410 linear feet of coping @ $2.00	4,820.00	
1400 cubic yards of excavation for foundations @ 50c	700.00	
1845 cubic yards of earth filling over arches @ 50c	922.50	
		146,908.00

Note. In addition to this $146,908 must be considered the following already included under the appropriate heads in the above estimate, viz:

14,256 cubic yards of dry rubble core wall @ $3.00	$42,768.00	
17,453 cubic yards of embankment @ 30c	5,235.90	
	48,003.90	

making the total cost of the viaduct exclusive of brick conduit $194,911.90.

Surveys, office expenses, superintendence, inspection 5 %	54,645.13
Contingencies 20 %, due to the uncertainty as to the character of the substrata	218,580.51
	$1,366,128.18

It is thought that the conduit as planned above could be completed in two and a half years with ample means, assuming no delay by reason of land condemnation.

It is not unlikely that with more time for careful survey and study of the route a line might be obtained which could be built for less than the sum estimated.

A green line has been drawn on the tracing A showing the approximate route of an open canal 14 feet in width and some 30,000 feet in length which might possibly be built (leaving out land damages) for a sum slightly less than the 9-foot conduit, but only an accurate survey could determine this.

Very respectfully, your obedient servant,

THOS. LINCOLN CASEY
Brig. Gen., Chief of Engineers.

[Committee No. 198.]

Letter of General T. L. Casey, Chief of Engineers.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., January 8, 1889.

My dear SENATOR EDMUNDS: In compliance with your request I have the honor to inclose a memorandum showing the Officers of the Corps of Engineers constituting "The Board of Engineers" in the years 1879 to 1884, and also the only Boards of

Engineers and their members that have considered any questions connected with the Increased Water Supply for the city.

Very respectfully, your obedient servant,

THOS. LINCOLN CASEY,
Brig. Gen., Chief of Engineers.

Senator GEORGE F. EDMUNDS,
Chairman Joint Committee on Washington Aqueduct Tunnel, etc.

[Committee No. 199.]

Members of the Board of Engineers, from 1879 *to* 1884.

Year ending June 30, 1879.—Col. J. G. Barnard, Col. Z. B. Tower, Col. H. G. Wright.
Year ending June 30, 1880.—Col. J. G. Barnard, Col. Z. B. Tower, Col. John Newton, Lieut. Col. Henry L. Abbot.
Year ending June 30, 1881.—Col. Z. B. Tower, Col. John Newton, Lieut. Col. Henry L. Abbot.
Year ending June 30, 1882.—Col. Z. B. Tower, Col. John Newton, Lieut. Col. Henry L. Abbot.
Year ending June 30, 1883.—Col. Z. B. Tower (until Jan. 10, 1883), Col. John Newton, Lieut. Col. Henry L. Abbot, Col. C. B. Comstock (from Aug. 13, 1882).
Year ending June 30, 1884.—Col. John Newton (until Mar. 6, 1884), Col. J. C. Duane (from April 12, 1884), Lieut. Col. Henry L. Abbot, Lieut. Col. C. B. Comstock.

The only Boards of Engineers that have considered subjects connected with the Increased Water Supply, were—

The Board constituted by Special Orders No. 107, Headquarters Corps of Engineers, dated July 15, 1885, consisting of Col. Thos. Lincoln Casey, Lt. Col. William P. Craighill, Major Garret J. Lydecker. (See report on page 2497, Annual Report of the Chief of Engineers for 1885.)

The Board of Engineers, consisting of—Col. James C. Duane, Lieut. Col. Henry L. Abbot, Lieut. Col. Cyrus B. Comstock, Lieut. Col. David C. Houston, Lieut. Col. Walter McFarland, By Special Orders No. 111, Headquarters Corps of Engineers, dated August 12, 1886. (See report on page 2546, Annual Report of the Chief of Engineers for 1887.)

[Committee No. 200.]

Letter of General T. L. Casey, Chief of Engineers.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington D. C., Jan. 29, 1889.

Hon. GEORGE F. EDMUNDS,
United States Senate, Washington, D. C.

SIR: In accordance with your request by telegraph of this date, I have the honor to transmit you herewith a copy of the bond of Beckwith & Quackenbush.

Very respectfully, your obedient servant,

THOS. LINCOLN CASEY,
Brig. Gen., Chief of Engineers.

[Committee No. 201.]

Copy of bond of Beckwith & Quackenbush with Major Lydecker, October 29, 1883.

[Form 20.]

CONTRACTOR'S BOND.

Know all men by these presents, That we, Clinton Beckwith and John V. Quackenbush, of Mohawk, N. Y., as principals, and Philo Remington of Ilion, Herkimer Co., N. Y., Henry A. Daniel, of Herkimer, Herkimer Co., N. Y., and Daniel Candee of Syracuse, N. Y., Henry D. Alexander of Mohawk, N. Y., and Floyd C. Shepherd of

lion, N. Y., as sureties, are held and bound unto the UNITED STATES OF AMERICA in he penal sum of two hundred thousand ($200,000) dollars, to the payment of which sum, well and truly to be made, we do bind ourselves, our heirs, executors, and administrators, jointly and severally, firmly by these presents.

Given under our hands and seals this twenty-ninth day of October 1883.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the above-bounden Clinton Beckwith and John V. Quackenbush have, on the twenty-ninth (29th) day of October, 1883, entered into a contract with Major G. J. Lydecker, Corps of Engineers, U. S. Army, for Construction of Tunnel for Increasing the water supply of Washington, D. C.

Now, therefore, if the above-bounden Clinton Beckwith and John V. Quackenbush, their heirs, executors, and administrators, shall and will, in all respects, duly and fully observe and perform all and singular the covenants, conditions, and agreements, in and by the said contract agreed and covenanted by them to be observed and performed, and according to the true intent and meaning of the said contract, and as well during any period of extension of said contract that may be granted on the part of the United States as during the original term of the same, including the covenant that the said C. Beckwith and J. V. Quackenbush shall be responsible for, and pay all liabilites incurred in the prosecution of the work for labor and material, then the above obligation shall be void and of no effect; otherwise to remain in full force and virtue.

Witnesses:

WILLIAM H. BRIGHT	CLINTON BECKWITH	[SEAL]
WILLIAM H. BRIGHT	JOHN V. QUACKENBUSH	[SEAL]
WILLIAM H. BRIGHT (as to Philo Remington)	PHILO REMINGTON	[SEAL]
	HONNIE A. DEIMEL	[SEAL]
WILLIAM H. BRIGHT	DANIEL CANDEE	[SEAL]
JOAB SMALL	HENRY D. ALEXANDER	[SEAL]
WILLIAM H. BRIGHT	FLOYD C. SHEPARD	[SEAL]
WILLIAM H. BRIGHT		

STATE OF NEW YORK,
County of Herkimer, Northern District of New York ss:

I, Henry D. Alexander, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of forty thousand dollars over and above all my debts and liabilities.

HENRY D. ALEXANDER

Before me:

WILLIAM H. BRIGHT
U. S. Circuit Court Commissioner

STATE OF NEW YORK
County of Herkimer, Northern District of New York, ss:

I, Floyd C. Shepard, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of thirty thousand dollars over and above all my debts and liabilities.

FLOYD C. SHEPARD

Before me:

WILLIAM H. BRIGHT
U. S. Circuit Court Commissioner N. D. of N. Y.

STATE OF NEW YORK
County of Herkimer Northern District of New York ss.

I, Philo Remington, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of Two hundred thousand dollars, over and above all my debts and liabilities.

PHILO REMINGTON

Before me,

WILLIAM H. BRIGHT,
U. S. Circuit Court Commissioner N. D. of New York.

STATE OF NEW YORK
County of Oneida Northern District of New York ss.

I, Henry A. Deimel, one of the sureties named in the within bond, do swear that I am pecuniarily worth the sum of Eighty thousand dollars, over and above all my debts and liabilities.

HOMIE A DEIMEL

Before me,

WILLIAM H. BRIGHT,
U. S. Circuit Court Commissioner N. D. of New York

I, William H. Bright, U. S. Circuit Court Commr., do hereby certify that Philo Remington, Henry A. Deimel and Henry D. Alexander and Floyd C. Shepard the sureties above named, are personally known to me, and that, to the best of my knowledge and belief each is pecuniarily worth, over and above all his debts and liabilities, the sum stated in the accompanying affidavit subscribed by him.

WILLIAM H. BRIGHT,
U. S. Circuit Court Commissioner N. D. of N. Y.

STATE OF NEW YORK
County of Onondaga ss.

I, Daniel Candee, one of the sureties named in the within bond do swear that I am pecuniarily worth the sum of Fifty thousand dollars over and above all my debts and liabilities.

DANIEL CANDEE.

Sworn to before me Nov. 3, 1883.

A. JUDD NORTHUP
County Judge Onondaga Co., N. Y.

I, A. Judd Northup, County Judge Onon. Co., N. Y. do hereby certify that Daniel Candee the surety above named is personally known to me, and that to the best of my knowledge and belief is pecuniarily worth over and above all his debts and liabilities the sum stated in the accompanying affidavit, subscribed by him.

A. JUDD NORTHUP
County Judge Onondaga Co., N. Y.

Certified—A true copy

G. J. LYDECKER
Major of Engineers, U. S. A.

[Committee No. 204.]

Letter Gen'l H. G. Wright, February 21, 1889, *giving reasons for approval of the Aqueduct Tunnel project.*

WASHINGTON, *February* 21, 1889.

Hon. GEORGE F. EDMUNDS, U. S. Senate,
Chairman Aqueduct Committee:

SIR: I am in receipt of your communication of this date, in which you ask, in behalf of the Aqueduct Committee, that I state briefly the reasons for my approval of the plan of Major Lydecker for a continuous tunnel as distinguished from the original scheme, and in reply I have the honor to state:

1st. That so far as I could learn there were no plans or drawings showing the scheme upon which the original estimates of cost were based. These estimates, it was understood, were prepared by Major Twining when Engineer Commissioner of the District of Columbia, or under his direction, and not by the Engineer Bureau of the War Department.

2d. The plan of Major Lydecker for a deep continuous tunnel was not referred to a board of engineers, so far as I now remember, simply because it was not considered necessary to do so. It was the custom to refer to a board the plans of officers in charge of works only when there was some question as to the propriety of such plans, or from the impossibility of otherwise determining whether they were suited to the purpose or not. I gave the subject much study in connection with Major Lydecker and Capt. Hoxie his assistant, and was satisfied that the tunnel would fulfill all the required conditions, provided that solid, sound rock could be found at proper depth through its entire extent, and that the cost would not exceed that of other modes suggested for conducting the water to the new reservoir.

As the existence of continuous rock strata did not seem to me sufficiently demonstrated by the examinations already made, I insisted on shafts being sunk to determine the existence and character of rock within the depth below the surface admissible for the tunnel; and as to the cost, that comparative estimates be made for the tunnel and the other modes suggested for bringing the water to the new reservoir.

The character of the rock appearing from this examination to be satisfactory, and the tunnel plan being shown to be the least costly, there appeared to be no reason why the project should not be submitted for the approval of the Secretary of War, and it was recommended accordingly, with the proviso that the work of construction should be done by contract after due advertisement.

As before remarked it did not seem that the services of a board in this connection were at all necessary or desirable; and I have no recollection of any suggestion to that effect having been make by anybody.

Had the rock turned out to be continuous, solid, and enduring, as the officer in charge supposed from his investigations it would be, the tunnel project would, I believe, have been entirely satisfactory, and had the lining, subsequently found to be necessary, been faithfully built, all the advantages claimed for the project would still have been secured, leaving only the additional cost of such lining to be regretted.

Very respectfully, your obd't serv't,

H. G. WRIGHT,
Brig. and Bvt. Major-General (Retired).

[Committee No. 205.]

Letter Gen'l Th. Casey, Chief of Engineers, Feb'y 23, 1889, showing amount due contractor on Aqueduct Tunnel.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., February 23, 1889.

Senator GEORGE F. EDMUNDS,
Chairman Joint Committee on Washington Aqueduct Tunnel, &c.:

MY DEAR SENATOR: In answer to your telegram of this date in reference to money due Messrs. Beckwith & Quackenbush for work done on tunnel in connection with Increasing the water supply of this city, I have to state as follows:

Due Beckwith & Quackenbush for work in September and October, 1888..	$39,133.89
Retained percentage on last extension	10,605.65
Retained percentage on contract prior to May 18, 1888	13,814.03
Estimated sum now due for excavation actually completed	38,500.00
Total	102,053.57

The contractors have not been paid anything for Sept. or Oct., 1888.

Very respectfully, your obedient servant,

THOS. LINCOLN CASEY,
Brig. Gen., Chief of Engineers.

The following are the maps, diagrams, and drawings referred to in the report and the preceding testimony.

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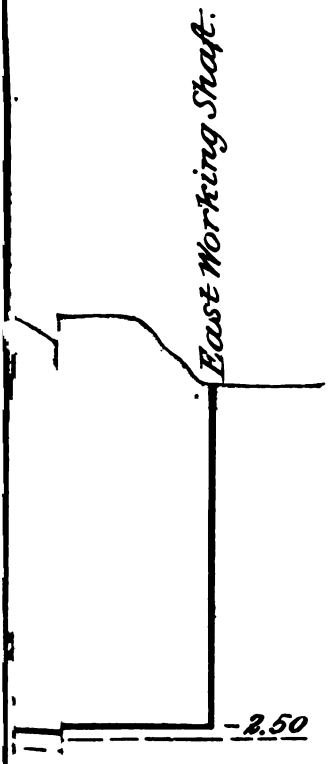

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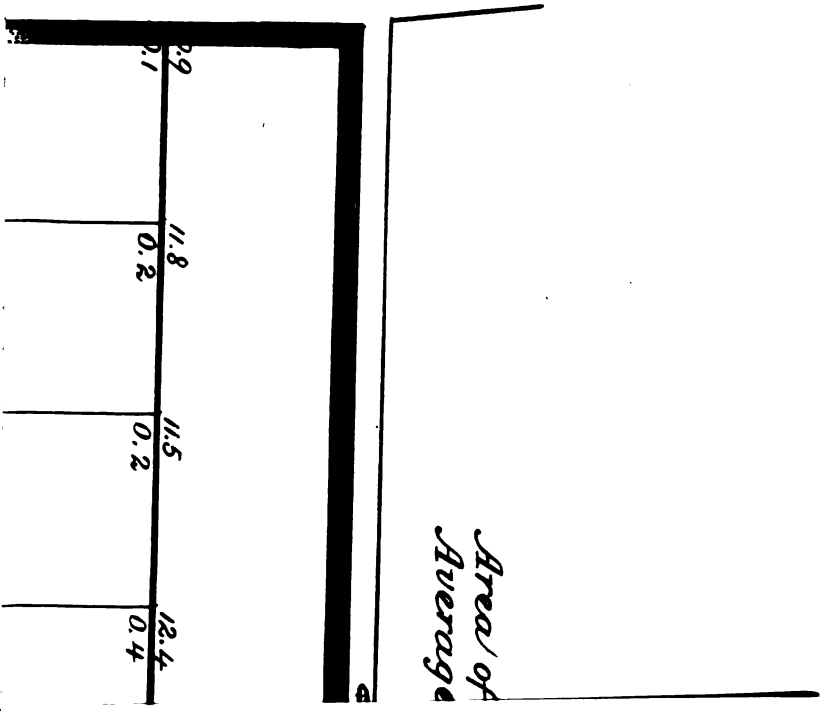

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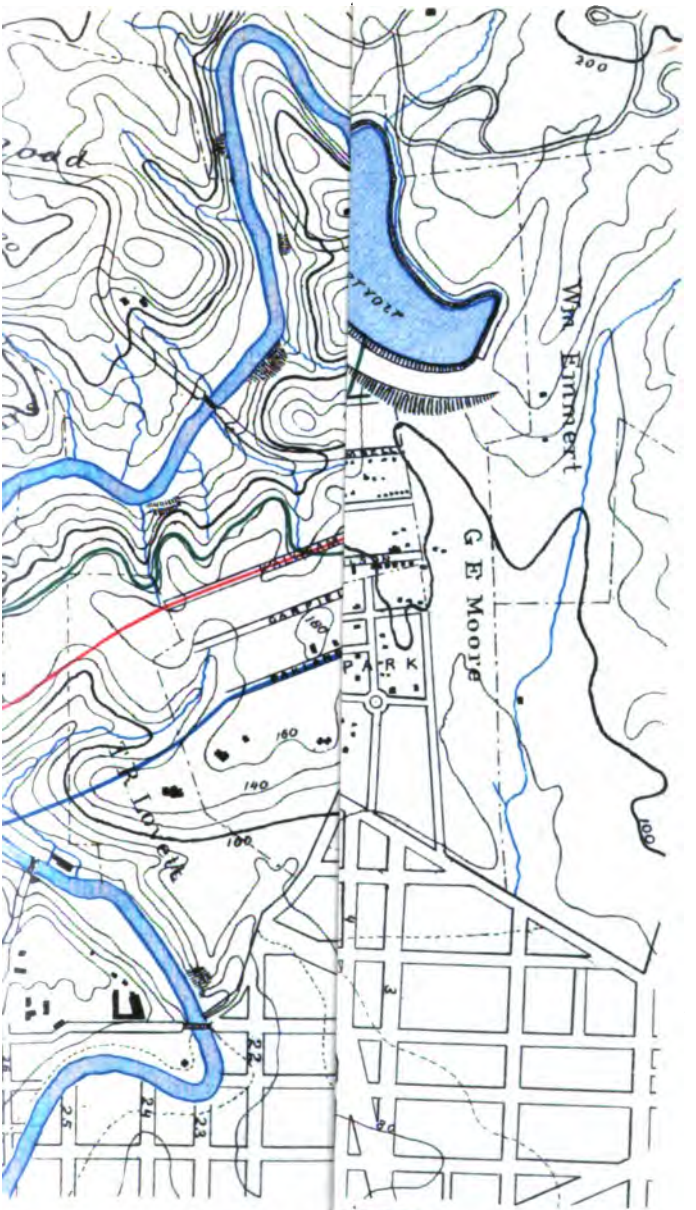
lines studied and
using an estimate

TTEE No. 195.]



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Gilbert
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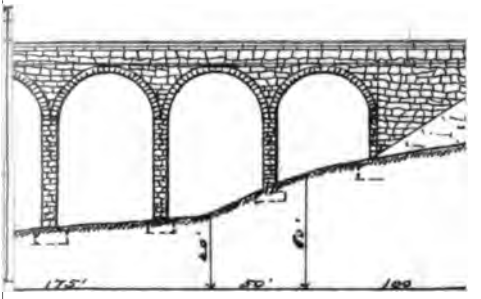

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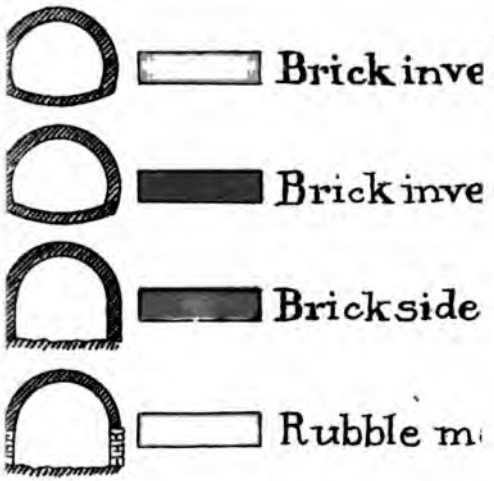
Plate 1.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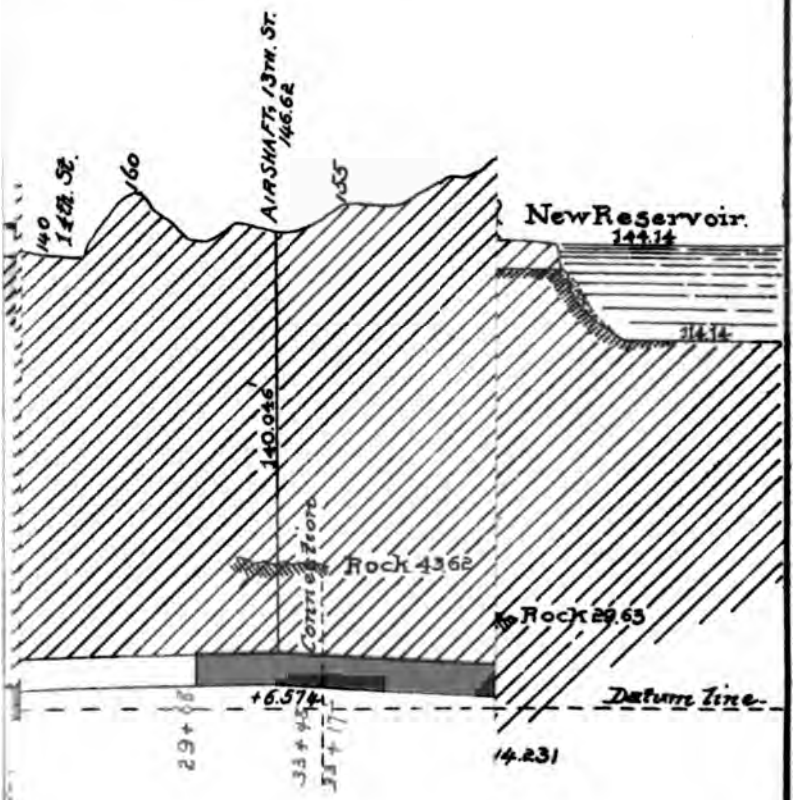
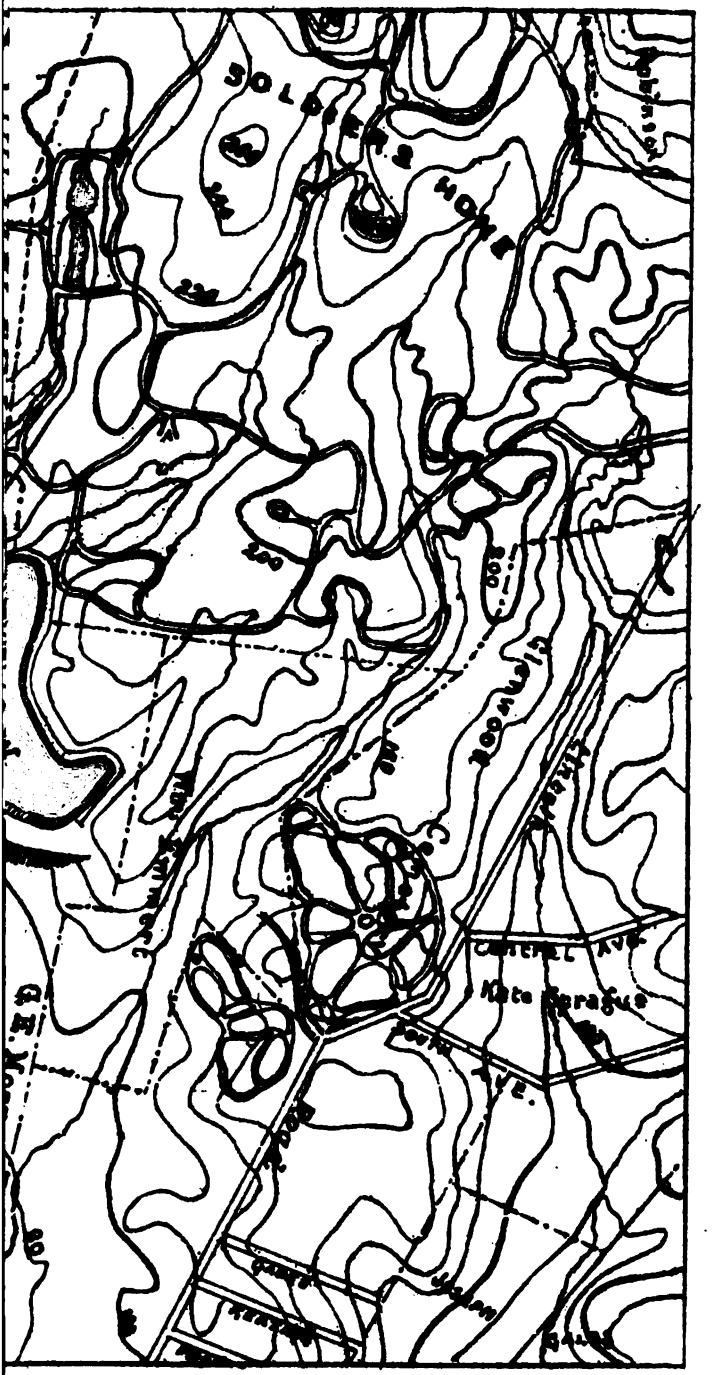
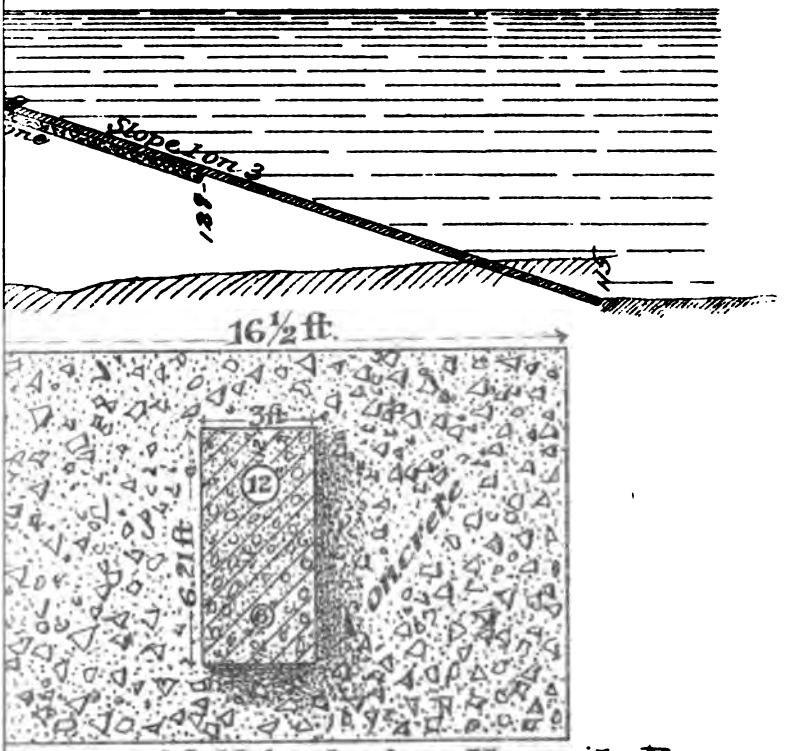
Brick inve
Brick side
Rubble m


AIR SHAFTS 13TH. ST.
146.62
140
14th. St.
160
155
New Reservoir.
144.14
144.14
140.046
Rock 43.62
Rock 29.63
+6.574
Datum Line
14.231



Wilson.
Flad } Expert Engrs
Graff
jan— 1889.

Plate 4



Line of 6 & 12 inch pipes through Dam

Scale 5ft to 1 in

Wilson.
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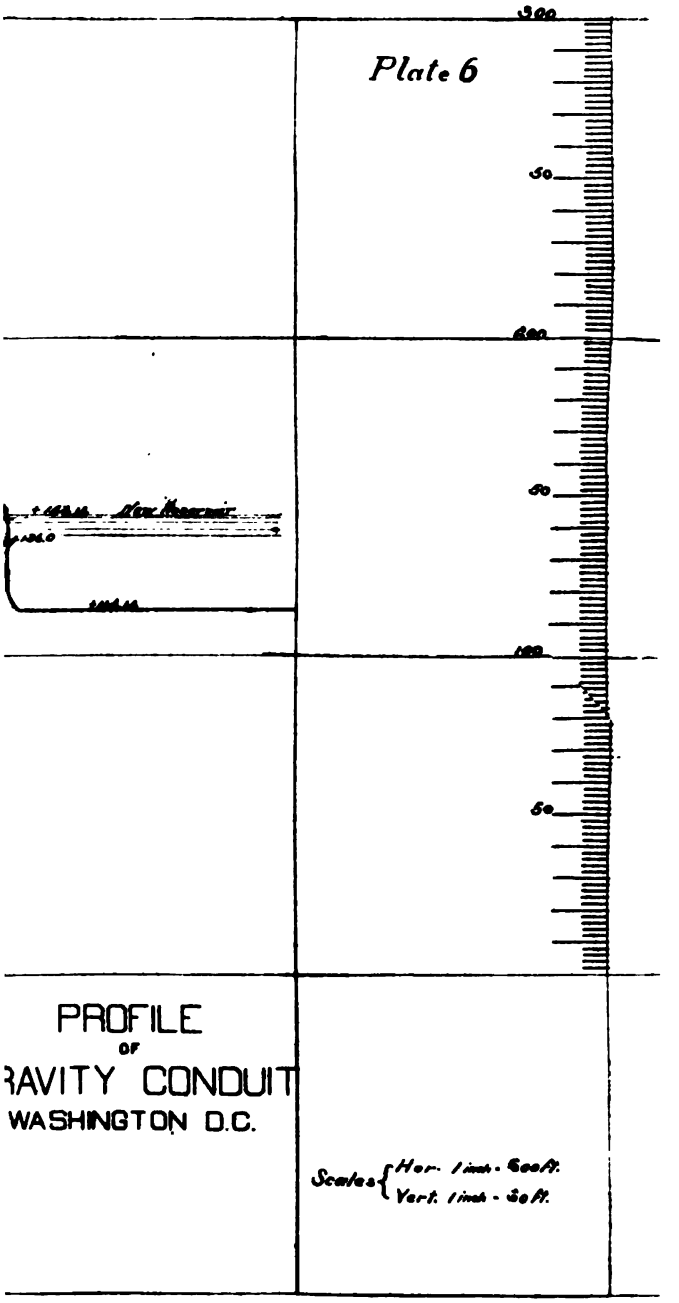
Plate 6
300
50
200
50
100
50
PROFILE
OF
RAVITY CONDUIT
WASHINGTON D.C.
Scales { Hor. 1 inch - 600 ft.
Vert. 1 inch - 30 ft.

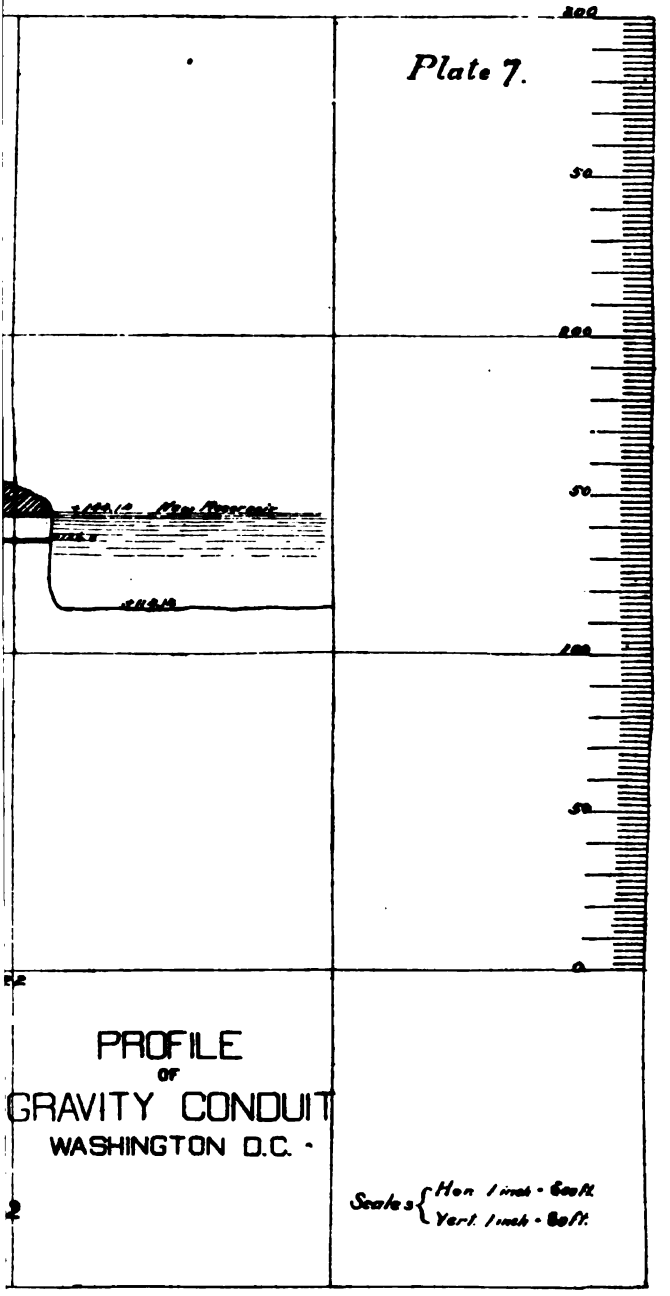
Plate 7.
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50
200
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100
50
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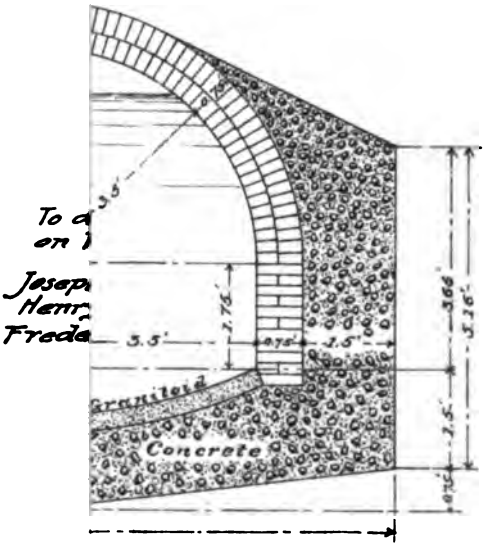
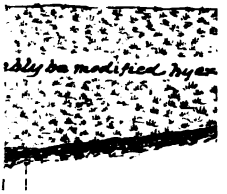
PROFILE
OF
GRAVITY CONDUIT
WASHINGTON D.C.
Scales { Hor. 1 inch = 6oo ft.
Vert. 1 inch = 8o ft.

Plate 8



Gravity Conduit.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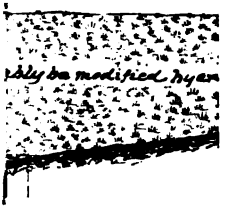
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Plate 10.

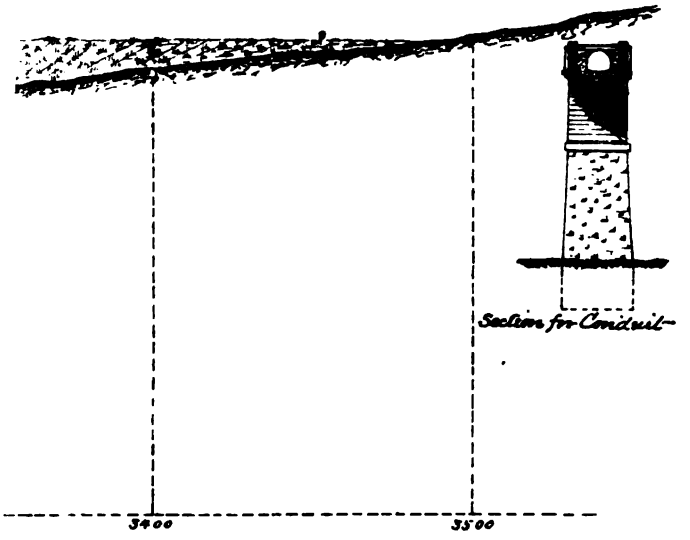
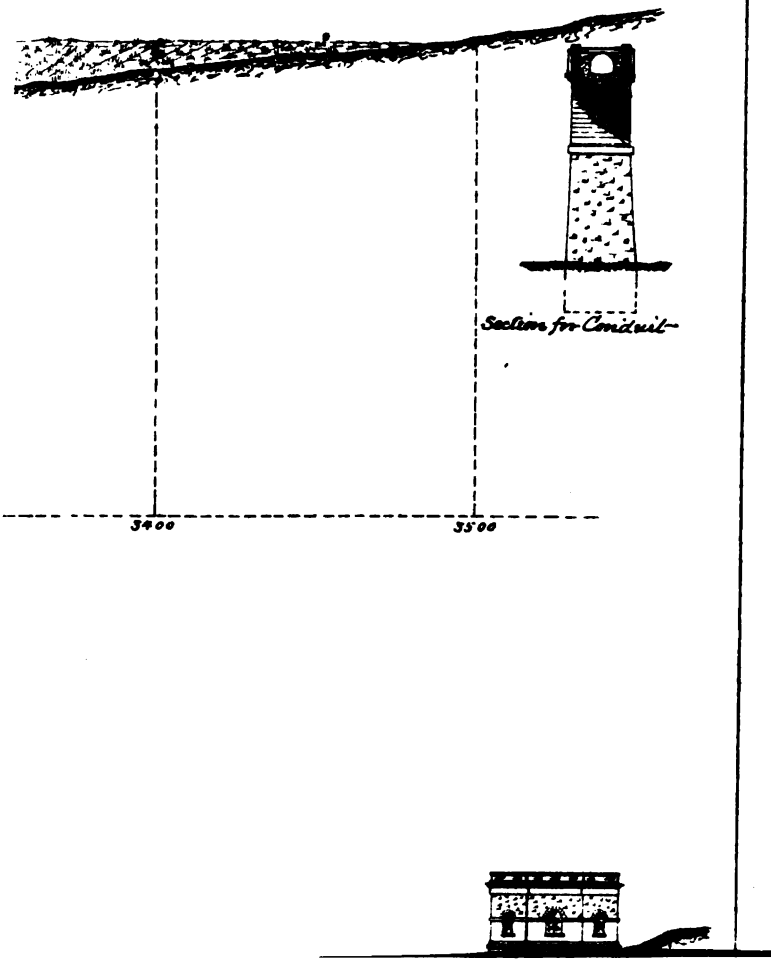
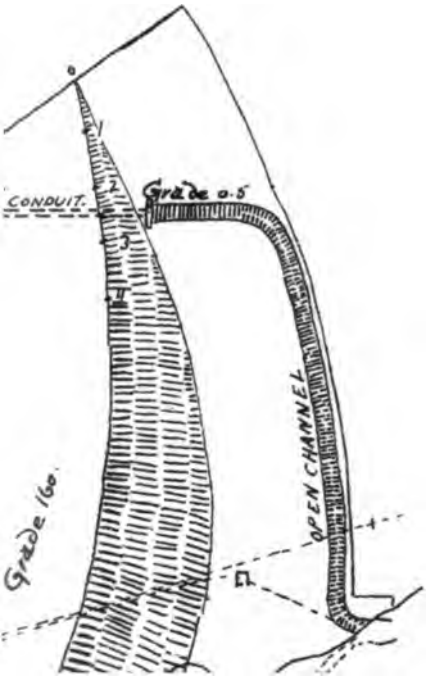
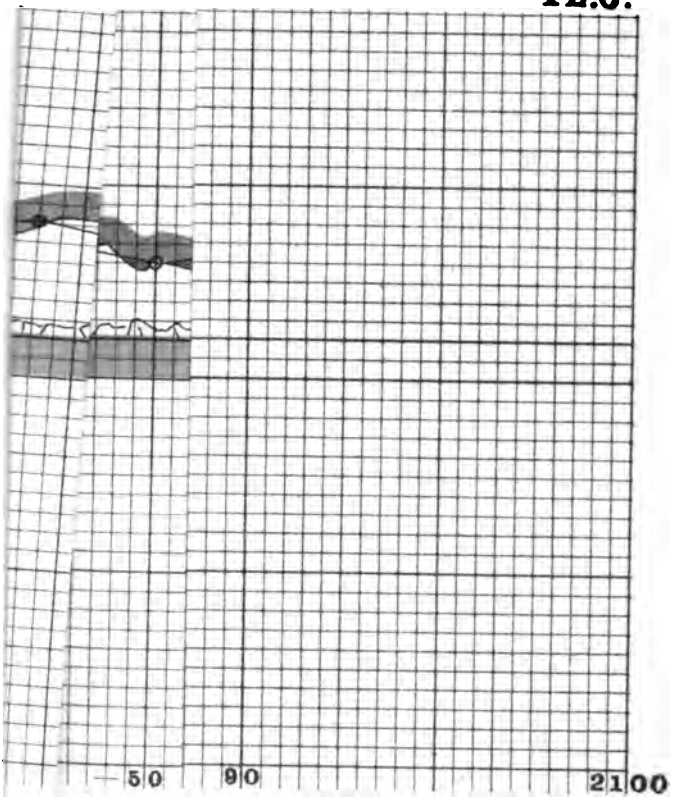


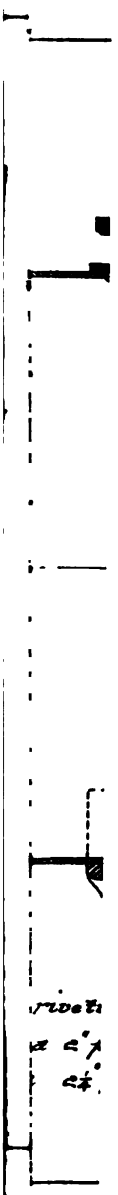
Plate 10.




CONDUIT.
Grade 0.5
OPEN CHANNEL
Grade 160.

Pl.6.

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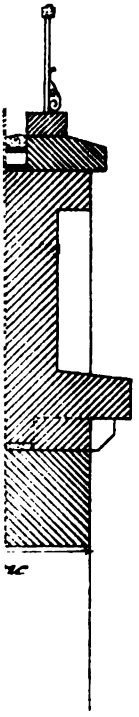

pipe